Maine Center for Disease Control and Prevention
An Office of the Department of Health and Human Services

Paul R. LePage, Governor Mary C. Mayhew, Commissioner

Tel. (207) 287-5672

Department of Health and Human Services
Maine Center for Disease Control and Prevention
286 Water Street
11 State House Station
Augusta, Maine 04333-0011
Tel.: (207) 287-8016; Fax: (207) 287-9058
TTY Users: Dial 711 (Maine Relay)
Fax (207) 287-4172

Subsurface Wastewater Unit

July 16, 2013

NORWESCO, Inc.
Attn.: Anastasia R. O'Hara, Sales Coordinator
P. O. Box 439
St. Bonifacius, MN 55375-0439

Subject: Product Registration, Norwesco/Snyder Low Profile Polyethylene Septic Tanks

Dear Ms. O'Hara:

The Division of Environmental Health has completed a review of a registration application for the subject products. This information was submitted pursuant to Section 6.HH of the Subsurface Wastewater Disposal Rules for registration for use in Maine. According to the information you provided, the tanks have been certified by the Canadian Standards Authority, pursuant to CSA Standard B66-10 for prefabricated sewage holding tanks.

The septic tanks consist of 750, 1,000, 1,250, and 1,500 gallon capacity low profile single-compartment polyethylene tanks and associated manhole risers. The tanks utilize sanitary tee fittings as inlet and outlet baffles. The product model numbers are:

NORWESCO	Snyder
43495	1007100W95301
43596	1006800W95301
43497	1006900W95301
43498	1007000W95301

On the basis of the information, the Division has determined that the subject septic tanks are acceptable for use in the State of Maine, provided that they are installed, operated, and maintained in conformance with the manufacturer's directions.

Because installation and owner maintenance has a significant effect on the working order of onsite sewage disposal systems, including their components, the Division makes no representation or guarantee as to the efficiency and/or operation of [product]. Further, registration of this product for use in the State of Maine does not represent Division preference or recommendation for this product over similar or competing products.

If you have any questions please feel free to contact me at (207) 287-5695.

Sincerely,

James A. Jacobsen

James A. Jacobsen
Project Manager, Webmaster
Division of Environmental Health
Drinking Water Program
Subsurface Wastewater Unit
e-mail: james.jacobsen@maine.gov

/jaj

xc: File

NORWESCO

June 17, 2013

Division of Environmental Health
Drinking Water Program
Subsurface Wastewater Unit
Attn: James A. Jacobsen
286 Water Street
Augusta, ME 04333

Dear Mr. Jacobsen,

We have enclosed the following documents to facilitate our request to have the 750, 1000, 1250 and 1500 Low Profile Polyethylene Tanks approved for use in Maine as septic tanks. This request is made on behalf of Norwesco, Inc. and Snyder Industries, which are now owned by the same parent company.

- Applications for each tank
- Tank drawings
- Manhole Extension and lid drawings
- Low Profile Underground Tank Installation Instructions
- Our current CSA Certificate
- Reports from Entegee Engineering that include structural calculations
- Low Profile Literature

If there are any questions regarding this information, do not hesitate to contact me. Please forward any correspondence regarding this request to my attention. I am coordinating the approvals for both companies.

Thank You.

Anastasia R. O'Hara
Sales Coordinator
Water & Waste Management
Norwesco, Inc.
Direct Line 800.446.8817
Fax 800.874.2371

Maine Department of Health and Human Services
Bureau of Health
Division of Health Engineering
Wastewater and Plumbing Control Program

RECEIVED
JUN 25 2013

APPLICATION FOR REGISTRATION OF EXPERIMENTAL SYSTEM/INNOVATIVE TECHNOLOGY OR ONSITE SEWAGE DISPOSAL SYSTEM PRODUCT

Please complete the following Sections. Please print or type.

Applicant

Company Name: NORWESCO, INC and SNYDER INDUSTRIES
Contact Person: ANASTASIA R. O'HARA
Address: P O BOX 439
Town/City: ST BONIFACIUS State/Province: MN Zip Code: 55375-0439
Country: USA
Telephone: 800.446.8817 e-mail: anastasia.ohara@norwesco.com

Product

Product Name: 750 Gallon Low Profile Single Compartment Septic Tank
Model: 43495/100710W95301

Product Classification (choose one)

Primary or Secondary Treatment Unit

[X] Septic Tank [ ] Extended Aerobic Treatment Unit [ ] Recirculating Aerobic Unit

[ ] Aerobic Fixed Film Unit [ ] Other (specify) _____

Effluent Filter

[ ] Septic Tank Outlet Filter [ ] Post-Tank Filter [ ] Other (specify) _____

Disposal Device

[ ] Gravel-less Disposal Pipe [ ] Gravel-less Disposal Bed [ ] Chamber, Plastic

[ ] Chamber, Other [ ] Other (specify) _____

Miscellaneous

[ ] Pipe [ ] Effluent Flow Distribution Device [ ] Other (specify) _____

Claim

Describe the product's features (attach additional sheets if necessary).

Low Profile literature is enclosed

Describe the product's performance (attach additional sheets if necessary).

Entegee Engineering Reports are enclosed

Has the product received National Sanitation Foundation or Canadian Standards Authority approval?

[ ] No [X] Yes (If "yes", enclose a copy of the certification.) CSA Certification

IMPORTANT NOTE!

Don't forget to enclose relevant product literature, engineering specifications, studies, and third party certifications with this application.

I, Anastasia R. O'Hara (print name) am the [X] applicant [ ] agent for the applicant of the subject product.

I state that the information submitted is correct to the best of my knowledge and understand that any falsification is reason for the Department to deny registration for use of the product in Maine.

A R O'Hara
[ ] Signature of Applicant
[ ] Signature of Agent for Applicant

6-18-13
Date

Maine Department of Health and Human Services
Bureau of Health
Division of Health Engineering
Wastewater and Plumbing Control Program

RECEIVED
JUN 25 2013

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Please complete the following Sections. Please print or type.

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Contact Person: ANASTASIA R O'HARA
Address: P O BOX 439
Town/City: ST. BONIFACIUS State/Province: MN Zip Code: 55375-0439
Country: USA
Telephone: 800.446.8817 e-mail: anastasia.ohara@norwesco.com

Product

Product Name: 1000 Gallon Low Profile Single Compartment Septic Tank
Model: 43496/1006800W95301

Product Classification (choose one)

Primary or Secondary Treatment Unit

[X] Septic Tank [ ] Extended Aerobic Treatment Unit [ ] Recirculating Aerobic Unit

[ ] Aerobic Fixed Film Unit [ ] Other (specify) _____

Effluent Filter

[ ] Septic Tank Outlet Filter [ ] Post-Tank Filter [ ] Other (specify) _____

Disposal Device

[ ] Gravel-less Disposal Pipe [ ] Gravel-less Disposal Bed [ ] Chamber, Plastic

[ ] Chamber, Other [ ] Other (specify) _____

Miscellaneous

[ ] Pipe [ ] Effluent Flow Distribution Device [ ] Other (specify) _____

Claim

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Describe the product's performance (attach additional sheets if necessary).

Entegee Engineering Reports are enclosed

Has the product received National Sanitation Foundation or Canadian Standards Authority approval?

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(print name)

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A R O'Hara
[ ] Signature of Applicant
[ ] Signature of Agent for Applicant

6-18-13
Date

Maine Department of Health and Human Services
Bureau of Health
Division of Health Engineering
Wastewater and Plumbing Control Program

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Please complete the following Sections. Please print or type.

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Company Name: NORWESCO, INC and SNYDER INDUSTRIES
Contact Person: ANASTASIA R. O'HARA
Address: P O BOX 439
Town/City: ST. BONIFACIUS State/Province: MN Zip Code: 55375-0439
Country: USA
Telephone: 800. 446.8817 e-mail: anastasia.ohara@norwesco.com

Product

Product Name: 1250 Gallon Low Profile Single Compartment Septic Tank
Model: 43497/100690DW95301

Product Classification (choose one)

Primary or Secondary Treatment Unit

[X] Septic Tank [ ] Extended Aerobic Treatment Unit [ ] Recirculating Aerobic Unit

[ ] Aerobic Fixed Film Unit [ ] Other (specify) _____

Effluent Filter

[ ] Septic Tank Outlet Filter [ ] Post-Tank Filter [ ] Other (specify) _____

Disposal Device

[ ] Gravel-less Disposal Pipe [ ] Gravel-less Disposal Bed [ ] Chamber, Plastic

[ ] Chamber, Other [ ] Other (specify) _____

Miscellaneous

[ ] Pipe [ ] Effluent Flow Distribution Device [ ] Other (specify) _____

Claim

Describe the product's features (attach additional sheets if necessary).

Low Profile Literature is enclosed

Describe the product's performance (attach additional sheets if necessary).

Entegee Engineering Reports are enclosed

Has the product received National Sanitation Foundation or Canadian Standards Authority approval?

[ ] No [X] Yes (If "yes", enclose a copy of the certification.) CSA Certification

IMPORTANT NOTE!

Don't forget to enclose relevant product literature, engineering specifications, studies, and third party certifications with this application.

I, Anastasia R. O'Hara, am the [X] applicant [ ] agent for the applicant of the subject product.
(print name)

I state that the information submitted is correct to the best of my knowledge and understand that any falsification is reason for the Department to deny registration for use of the product in Maine.

AR O'Hara
[ ] Signature of Applicant
[ ] Signature of Agent for Applicant

6-18-13
Date

Maine Department of Health and Human Services
Bureau of Health
Division of Health Engineering
Wastewater and Plumbing Control Program

RECEIVED
JUN 25 2013

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Please complete the following Sections. Please print or type.

Applicant

Company Name: NORWESCO, INC and SNYDER INDUSTRIES
Contact Person: ANASTASIA R O'HARA
Address: P O BOX 439
Town/City: ST. BONIFACIUS State/Province: MN Zip Code: 55376-0439
Country: USA
Telephone: 800.446.8817 e-mail: anastasia.ohara@norwesco.com

Product

Product Name: 1500 Gallon Low Profile Single Compartment Septic Tank
Model: 43498/1007000W95301

Product Classification (choose one)

Primary or Secondary Treatment Unit

[X] Septic Tank [ ] Extended Aerobic Treatment Unit [ ] Recirculating Aerobic Unit

[ ] Aerobic Fixed Film Unit [ ] Other (specify) _____

Effluent Filter

[ ] Septic Tank Outlet Filter [ ] Post-Tank Filter [ ] Other (specify) _____

Disposal Device

[ ] Gravel-less Disposal Pipe [ ] Gravel-less Disposal Bed [ ] Chamber, Plastic

[ ] Chamber, Other [ ] Other (specify) _____

Miscellaneous

[ ] Pipe [ ] Effluent Flow Distribution Device [ ] Other (specify) _____

Claim

Describe the product's features (attach additional sheets if necessary).

Flow Rate Literature is enclosed.

Describe the product's performance (attach additional sheets if necessary).

Entesee Engineering Reports are enclosed.

Has the product received National Sanitation Foundation or Canadian Standards Authority approval?

[ ] No [X] Yes (If "yes", enclose a copy of the certification.) CSA Certification

IMPORTANT NOTE!

Don't forget to enclose relevant product literature, engineering specifications, studies, and third party certifications with this application.

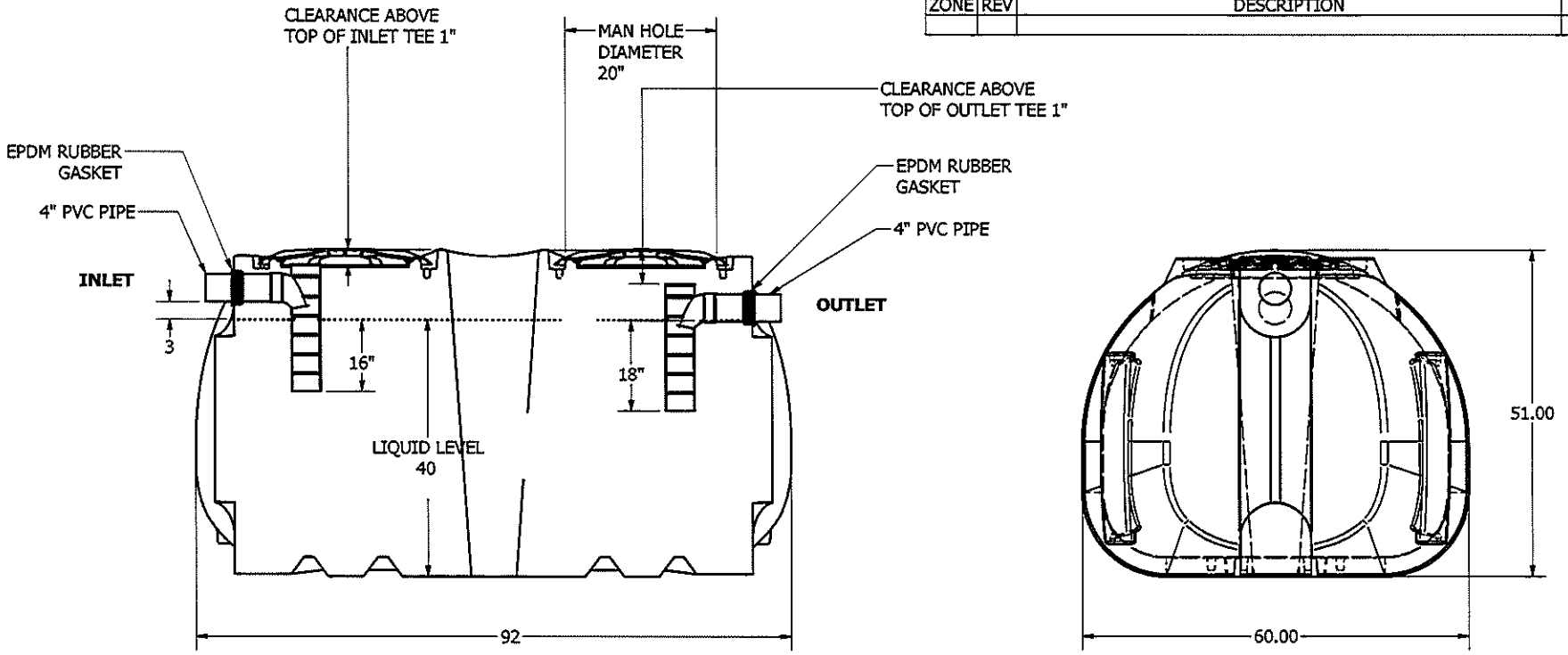
I, Anastasia R. O'Hara (print name) am the [X] applicant [ ] agent for the applicant of the subject product.

I state that the information submitted is correct to the best of my knowledge and understand that any falsification is reason for the Department to deny registration for use of the product in Maine.

A R O'Hara
[ ] Signature of Applicant
[ ] Signature of Agent for Applicant

6-18-13
Date

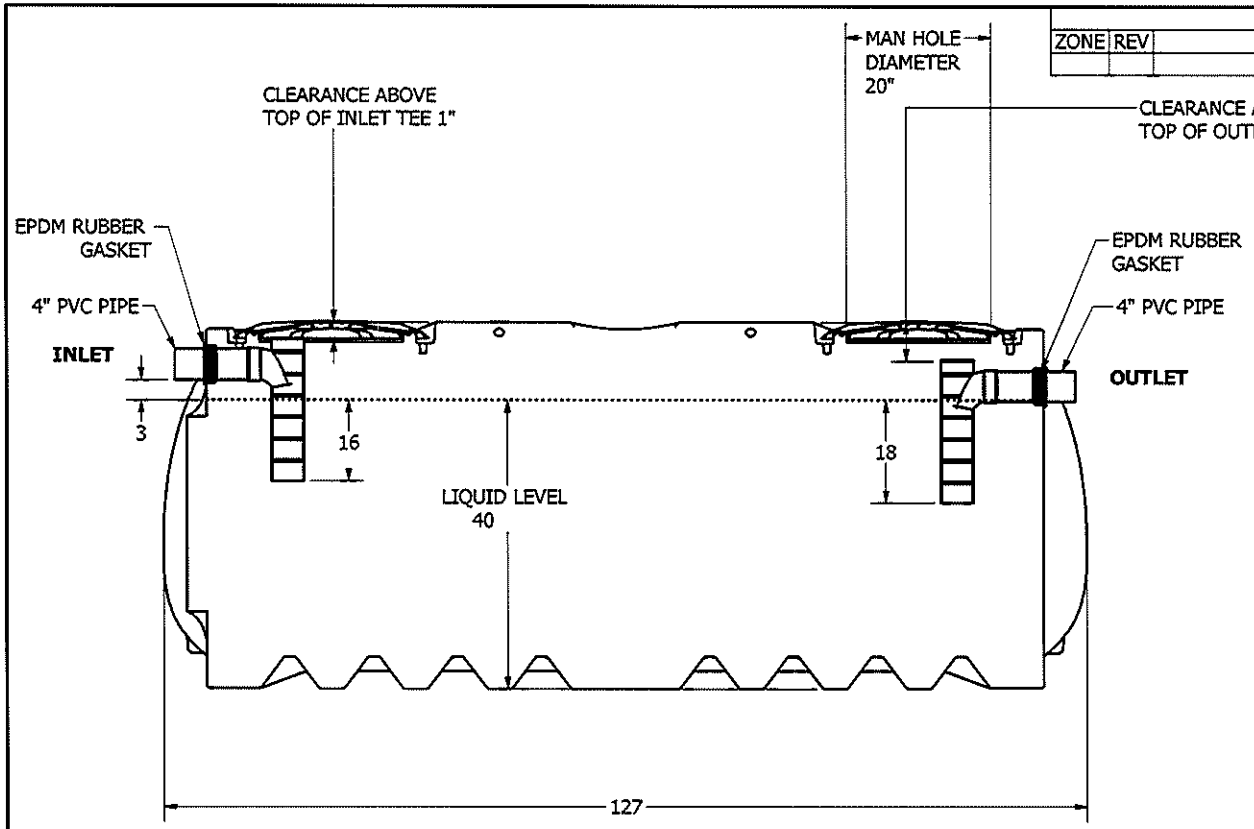
REVISION HISTORY				
ZONE	REV	DESCRIPTION	DATE	APPROVED

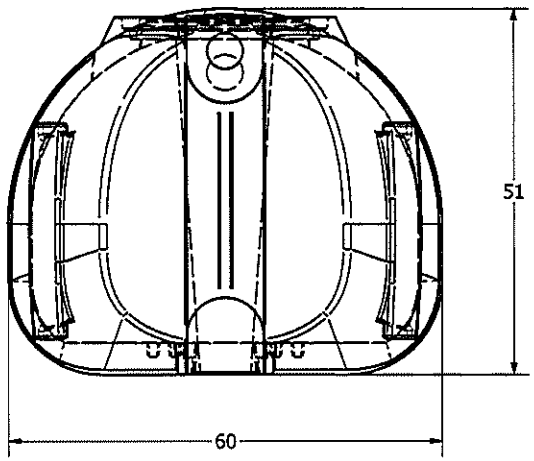


CONSTRUCTION MATERIAL: **HDPE**
MINIMUM TANK WALL THICKNESS: **.25"**
LIQUID SURFACE AREA: **25.61 FT^2**

DRAWN Todd Bolzer	12/28/2010	NORWESCO, INC., ST. BONIFACIUS, MN
CHECKED		TITLE: 750 GALLON LOW PROFILE SINGLE COMPARTMENT SEPTIC TANK
QA		
MFG		
APPROVED		SIZE B; NORWESCO P/N: 43495; SNYDER IND. P/N: 1007100W95301; REV
		SCALE: 1/16; SHEET 1 OF 1

REVISION HISTORY				
ZONE	REV	DESCRIPTION	DATE	APPROVED

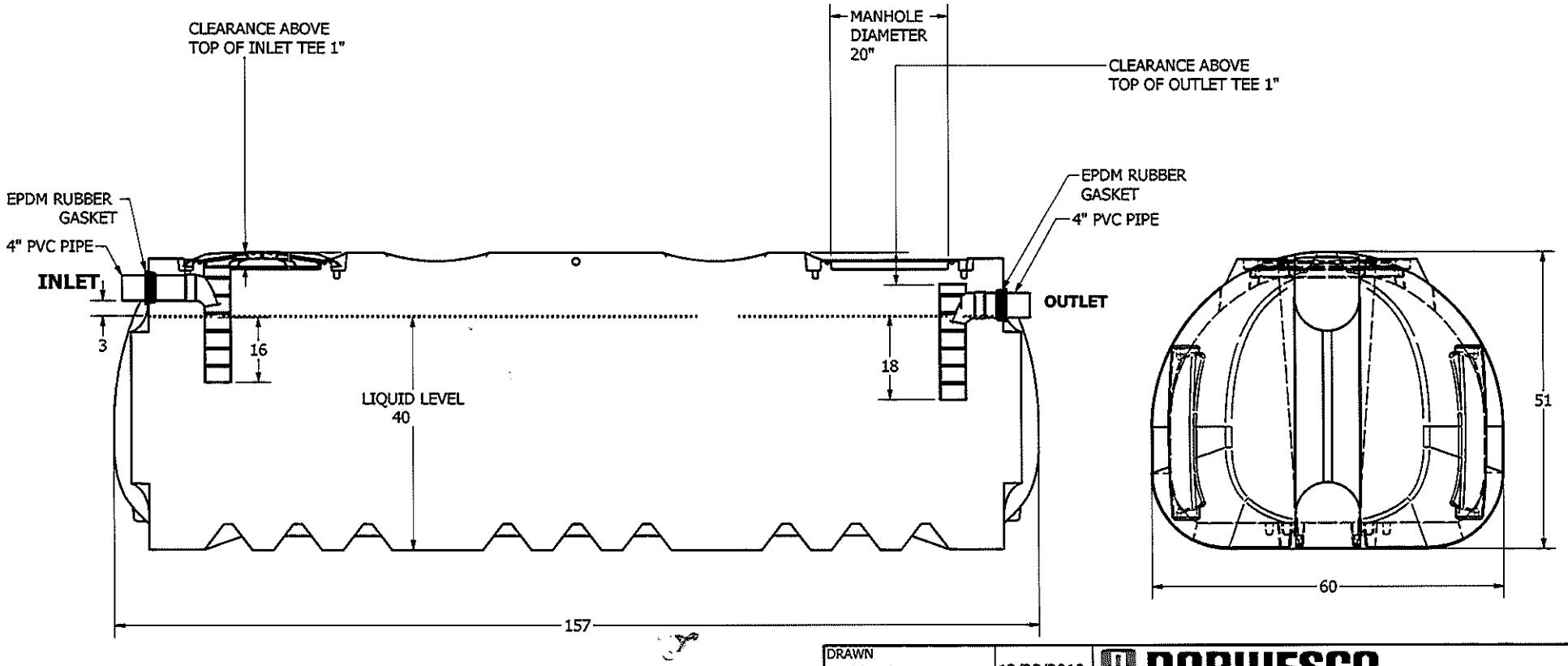




CONSTRUCTION MATERIAL: **HDPE**
MINIMUM TANK WALL THICKNESS: **.25"**
LIQUID SURFACE AREA: **34.15 FT^2**

DRAWN Todd Bolzer	12/28/2010	NORWESCO, INC., ST. BONIFACIUS, MN
CHECKED		TITLE: 1000 GALLON LOW PROFILE SINGLE COMPARTMENT SEPTIC TANK STD
QA		
MFG		
APPROVED		
		SIZE B; NORWESCO P/N: 43496; SNYDER IND. P/N: 1006800W95301; REV
		SCALE: 1/16; SHEET 1 OF 1

REVISION HISTORY				
ZONE	REV	DESCRIPTION	DATE	APPROVED



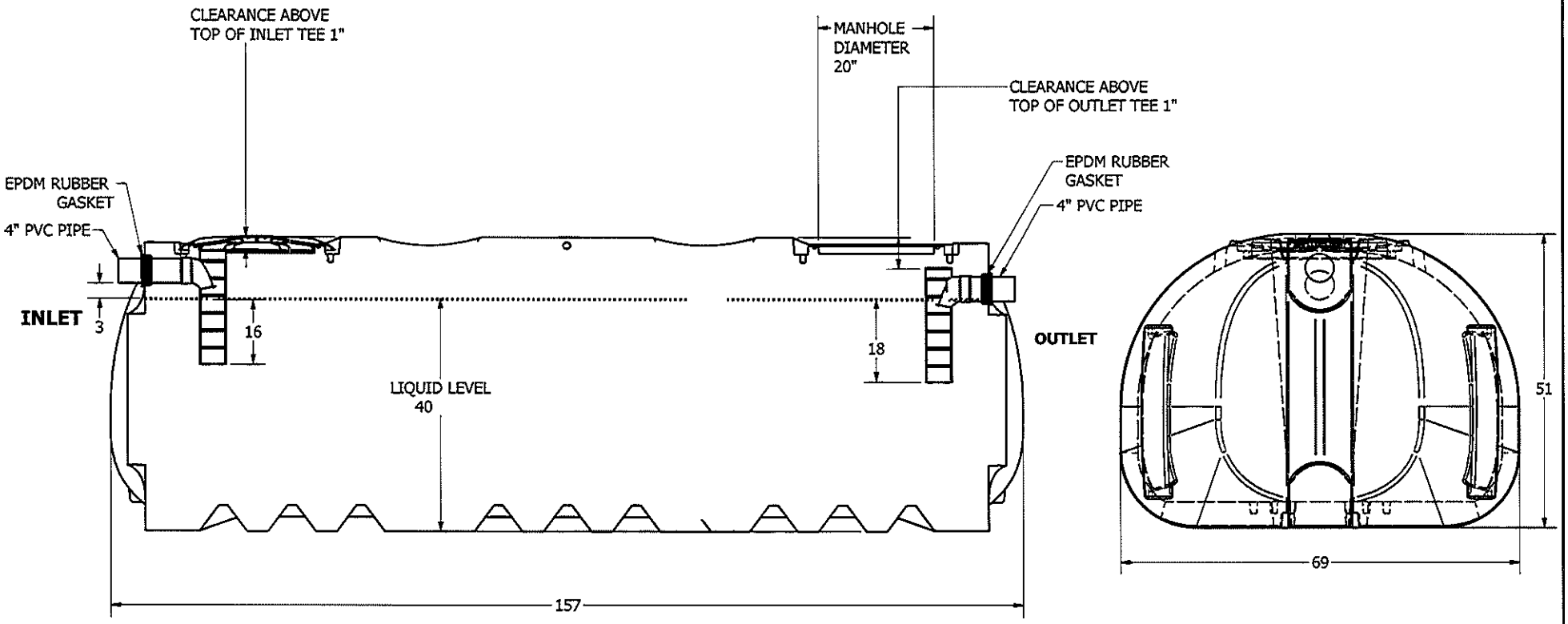
CONSTRUCTION MATERIAL: **HDPE**
MINIMUM TANK WALL THICKNESS: **.25"**
LIQUID SURFACE AREA: **41.68 FT^2**

DRAWN	Todd Bolzer	12/28/2010
CHECKED		
QA		
MFG		
APPROVED		

NORWESCO
NORWESCO, INC., ST. BONIFACIUS, MN

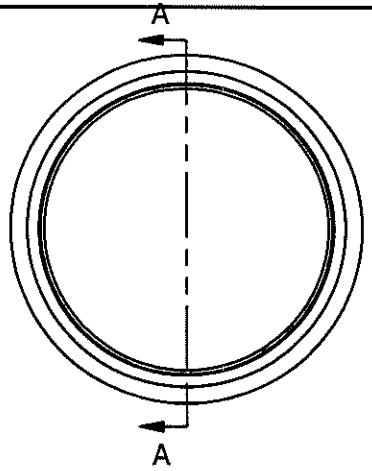
TITLE
1250 GALLON LOW PROFILE SINGLE COMPARTMENT SEPTIC TANK STD

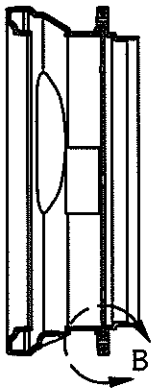
SIZE		NORWESCO P/N: 43497	REV
B		SNYDER IND. P/N: 1006900W95301	
SCALE: 1/16		SHEET 1 OF 1	



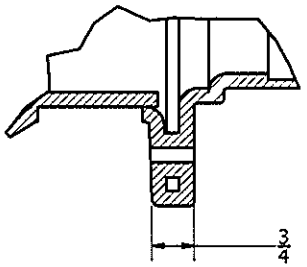
CONSTRUCTION MATERIAL: **HDPE**
MINIMUM TANK WALL THICKNESS: **.25"**
LIQUID SURFACE AREA: **51.14 FT^2**

DRAWN Todd Bolzer	12/28/2010	NORWESCO, INC., ST. BONIFACIUS, MN
CHECKED		TITLE: 1500 GALLON LOW PROFILE SINGLE COMPARTMENT SEPTIC TANK STD
QA		
MFG		
APPROVED		
		SIZE B; NORWESCO P/N: 43498; SNYDER IND. P/N: 1007000W95301; REV
		SCALE: 1/16; SHEET 1 OF 1

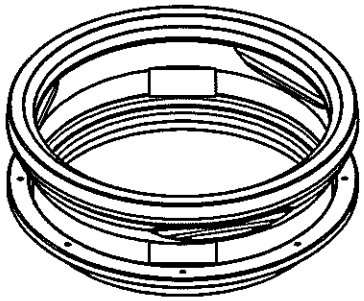


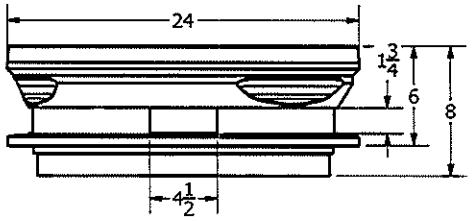


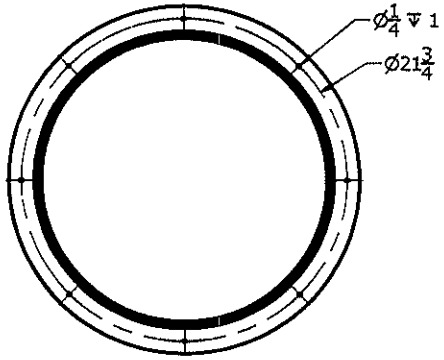
SECTION A-A
SCALE 1 /8



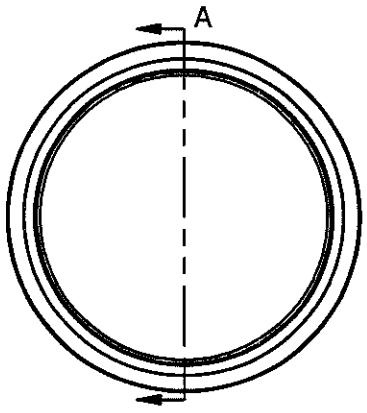
DETAIL B
SCALE 1 / 2

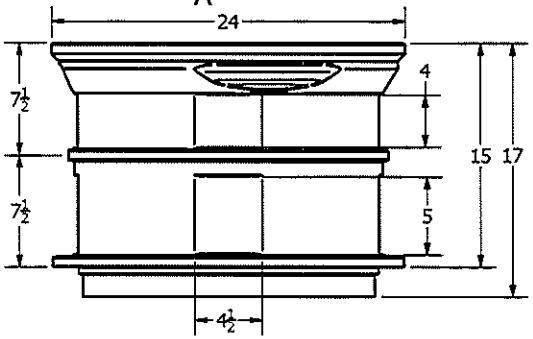


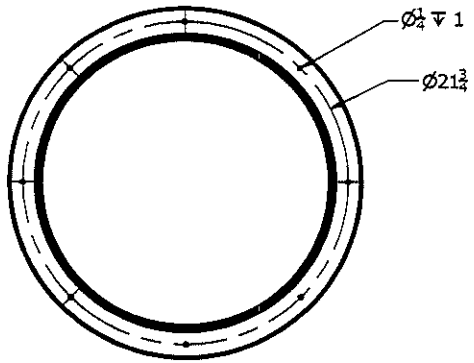


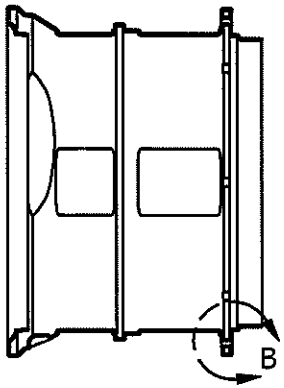


DRAWN Todd Bolzer	3/29/2012	NORWESCO, INC., ST. BONIFACIUS, MN
CHECKED		TITLE: 6 INCH LOW PROFILE MAN HOLE EXTENSION
QA		
MFG		
APPROVED		
		SIZE B | DWG NO | REV A
		SCALE: 1/16 | SHEET 1 OF 1

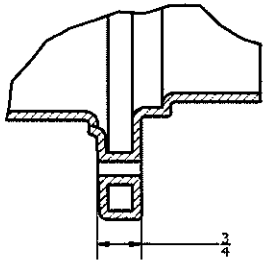




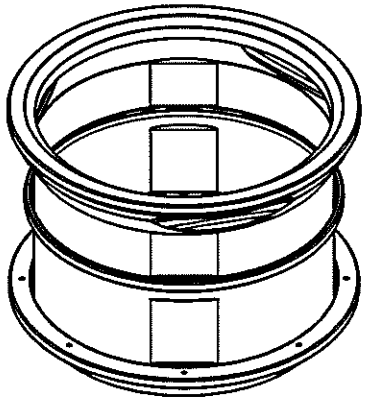




SECTION A-A
SCALE 1 /8



DETAIL B
SCALE 1 / 2

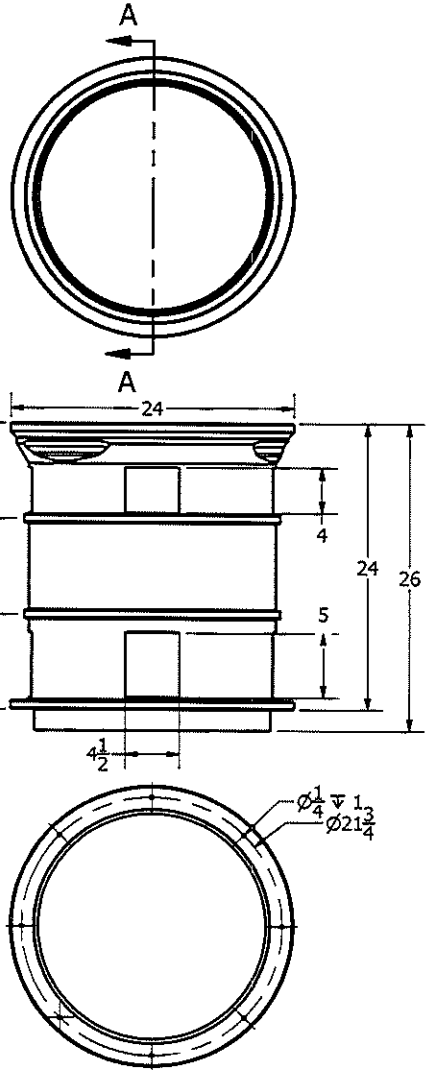


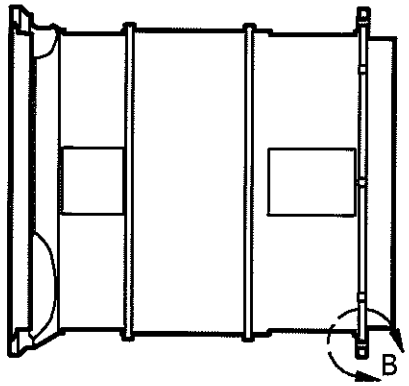
DRAWN Todd Bolzer	5/10/2009	NORWESCO, INC., ST. BONIFACIUS, MN
CHECKED		TITLE: 15 INCH LOW PROFILE MAN HOLE EXTENSION
QA		
MFG		
APPROVED		

SIZE		DWG NO	REV
B			E

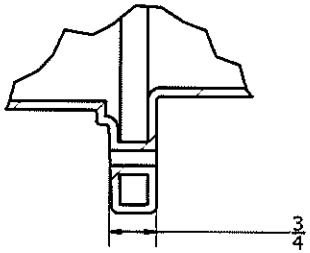
SCALE: 1/16 | SHEET 1 OF 1

REVISION HISTORY				
ZONE	REV	DESCRIPTION	DATE	APPROVED

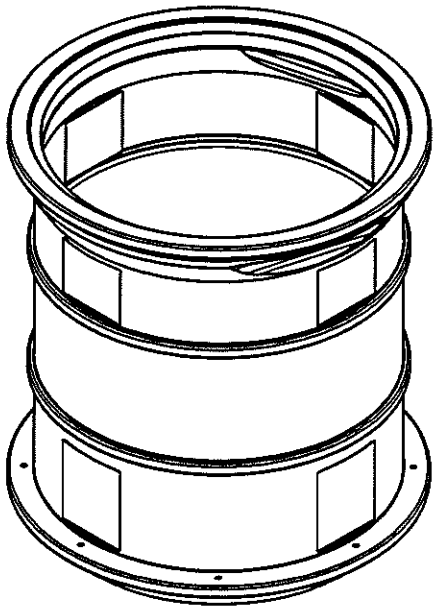




SECTION A-A
SCALE 1/8

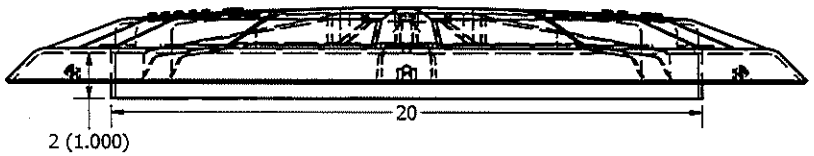


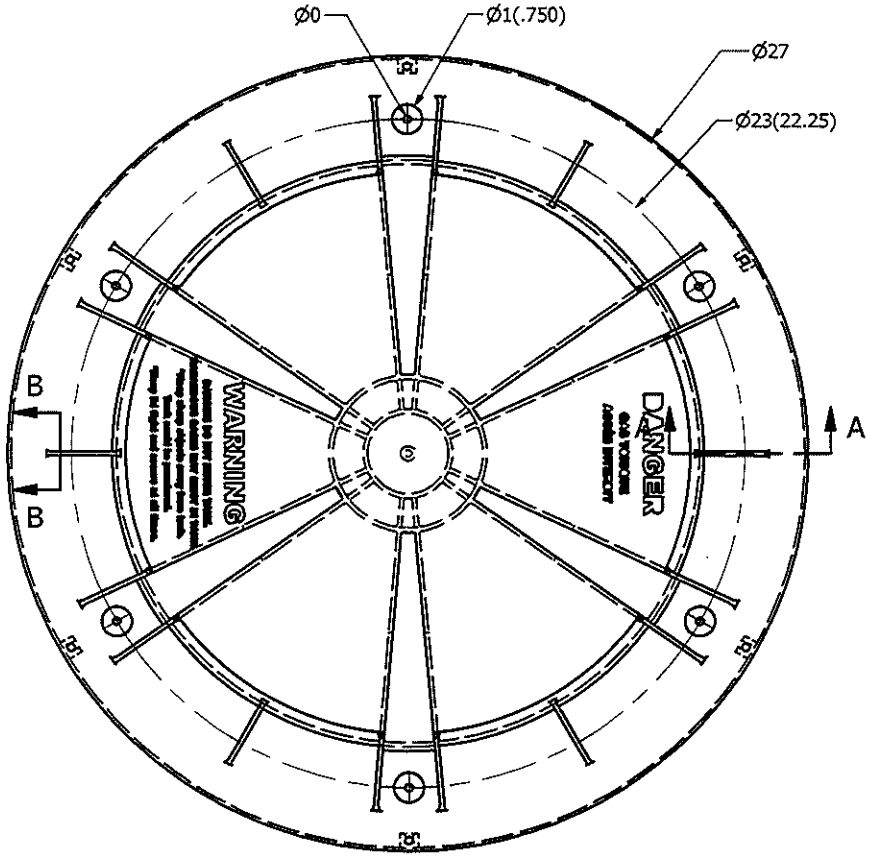
DETAIL B
SCALE 1 / 2

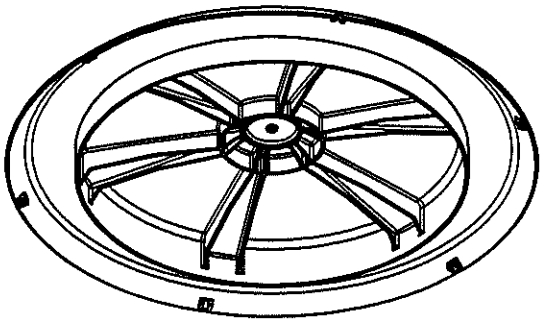


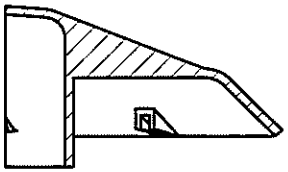
DRAWN Todd Bolzer	7/31/2009	NORWESCO, INC., ST. BONIFACIUS, MN
CHECKED		TITLE: 24 INCH LOW PROFILE MAN HOLE EXTENSION
QA		
MFG		
APPROVED		SIZE: B; DWG NO; REV
		SCALE: 1/16; SHEET 1 OF 1

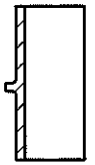
REVISION HISTORY				
ZONE	REV	DESCRIPTION	DATE	APPROVED









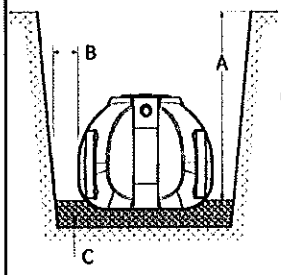


DRAWN Todd Bolzer	1/4/2011	NORWESCO, INC., ST. BONIFACIUS, MN
CHECKED		TITLE: LOW PROFILE SEPTIC LID
QA		
MFG		
APPROVED		SIZE: B; DWG NO: 92346; REV:
		SCALE: 1/16; SHEET 1 OF 1

NORWESCO

Low Profile Underground Tank Installation Instructions

1. EXCAVATION

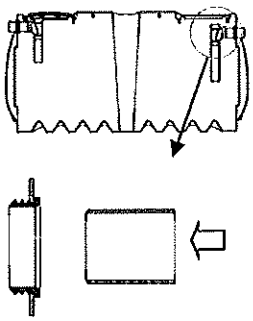


A. Excavate to a depth that will provide a minimum of 6" and maximum of 36" of cover over the top of the tank.

B. Allow 18" to 24" on both sides and both ends of the tank.

C. Prepare the tank bed. Preferred bedding material is well-packed sand — 6" minimum in soil terrain, 12" minimum in rock terrain. Native soil can be used if it is flowable, compactable, rock free, and can provide uniform support in the recessed rib areas. The tank should be installed level.

2. SEPTIC TANK CONNECTIONS



A. Low Profile septic tanks are provided with 4" PVC sanitary tees and rubber gaskets for the inlet and outlet.

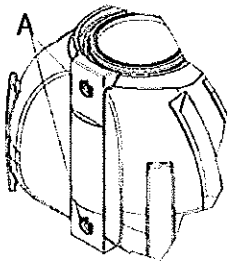
B. All pipes should be chamfered and gaskets lubricated.

C. Install gasket from the outside of the tank as shown in the diagram. From outside of the tank, push the pipe into the gasket.

D. Inlet and outlet piping should be solvent welded to sanitary tees.

E. Note the direction of flow. The outlet is lower than inlet and all tanks are marked accordingly.

3. CISTERN TANK INSTRUCTIONS



A. Install bulkhead fittings at the flat areas located on either end of the tank.

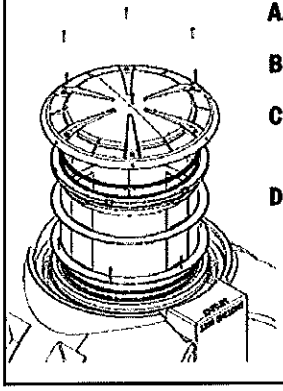
B. All tanks must be vented including each tank in an interconnected series.

C. The vent pipe should be the same diameter as the outlet pipe.

D. When multiple tanks are installed in series, you must maintain at least 36" of separation between tanks.

E. Flexible connections are required between each tank on interconnected tank installations.

4. MANHOLE EXTENSIONS



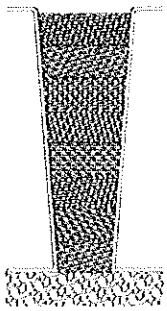
A. Install manhole extensions and/or lid risers before you backfill.

B. Manhole extensions are supplied with gaskets and screws.

C. Install screws as shown in the diagram around the circumference of the base of the extension.

D. Be sure that the self-tapping screws seat squarely into the tank.

5. BACKFILLING EXTERIOR



A. Backfill around tank with 12" layers and compact each layer. Always compact ends first.

B. Each of the interior support columns must be filled with free-flowing fill and compacted in 6" layers. The columns must have the soil compacted to provide structural support. See diagram.

C. Be sure to compact soil under inlet and outlet piping.

D. Maximum backfill over the top of the tank is 36".

E. Mound soil over the top of the tank to direct surface water away from the tank.

6. BACKFILL MATERIALS

A. Free flowing native soil can be used as backfill. All fill must be free of any wood, masonry debris, or silt. Shrink/swell clay soils should be avoided as backfill material.

B. If the native soil is unsuitable, replace it will a free flowing, compactable material. A typical specification is 100% smaller than 1 1/2" and approximately 50% smaller than 1/4".

C. Sharp objects must not come into contact with the tank.

For septic installations, it is important to contact your local or state sanitarian regarding approved installation procedures.

CAUTION

Failure to comply with the points below voids warranty.

A. Tanks are not fire-resistant. Do not store them near an open flame or heat in excess of 180 °F.

B. Do not install any tank under the path of vehicles or heavy equipment.

C. Do not leave Low Profile septic tanks empty for extended periods of time.

D. Norwesco Low Profile septic tanks and cisterns are designed only for use as underground tanks.

E. Low Profile septic tanks and Low Profile cisterns may be used as holding tanks or for pumping applications where permitted by local codes.

F. Low Profile septic and Low Profile cisterns are made of resins that meet FDA specifications for the storage of drinking water and can be used for that application.

G. Protect the tank from sharp objects which could puncture it and cause leakage.

H. Where saturated soil or seasonal high water tables are indicated between the bottom of the tank and the ground surface, see separate supplemental installation instructions for these site conditions. Supplemental instructions can be found on our website.

I. For installations requiring counter-buoyancy measures; please refer to special instructions on our website.

Norwesco advises against the use of a plastic underground tank for any other uses! Such uses would void any Norwesco product warranty either stated or implied. In no event shall Norwesco be held liable for any consequential damages.

WARRANTY

The Norwesco underground tanks, when installed in accordance to manufacturer's instructions, are warranted against defective materials and/or workmanship for a full three (3) years from the date of manufacture. Should a defect appear within the warranty period, Norwesco will supply a new equivalent tank in replacement thereof. Norwesco's liability is limited to the value of the tank itself and specifically excludes the cost of installation and/or removal and consequential damages.

NORWESCO

NORWESCO INC.

4365 Steiner Street
P.O. Box 439
St. Bonifacius, MN 55375-0439

CSA Group

Certificate of Compliance

Certificate: 2321625 **Master Contract:** 185976

Project: 2480197 **Date Issued:** March 26, 2013

Issued to: **Norwesco Incorporated**

4365 Steiner St
St. Bonifacius, MN 55375
USA
Attention: Jerry Paulson

The products listed below are eligible to bear the CSA Mark shown

Justin Billey

Issued by: Justin Billey

PRODUCTS

CLASS 6921 01 - PLUMBING FIXTURES - Septic and Sewage Holding Tanks for Plumbing Systems

Polyethylene Septic Tanks and Sewage Holding Tanks:

- Septic Tank, Trickle (T) Type Models:
  - 750S, 1000S, 1250S, and 1500S

- Sewage Holding (H) Tank Models:
  - 750S, 1000S, 1250S, 1500S , 2000H, 2500H, and 2650H

APPLICABLE REQUIREMENTS

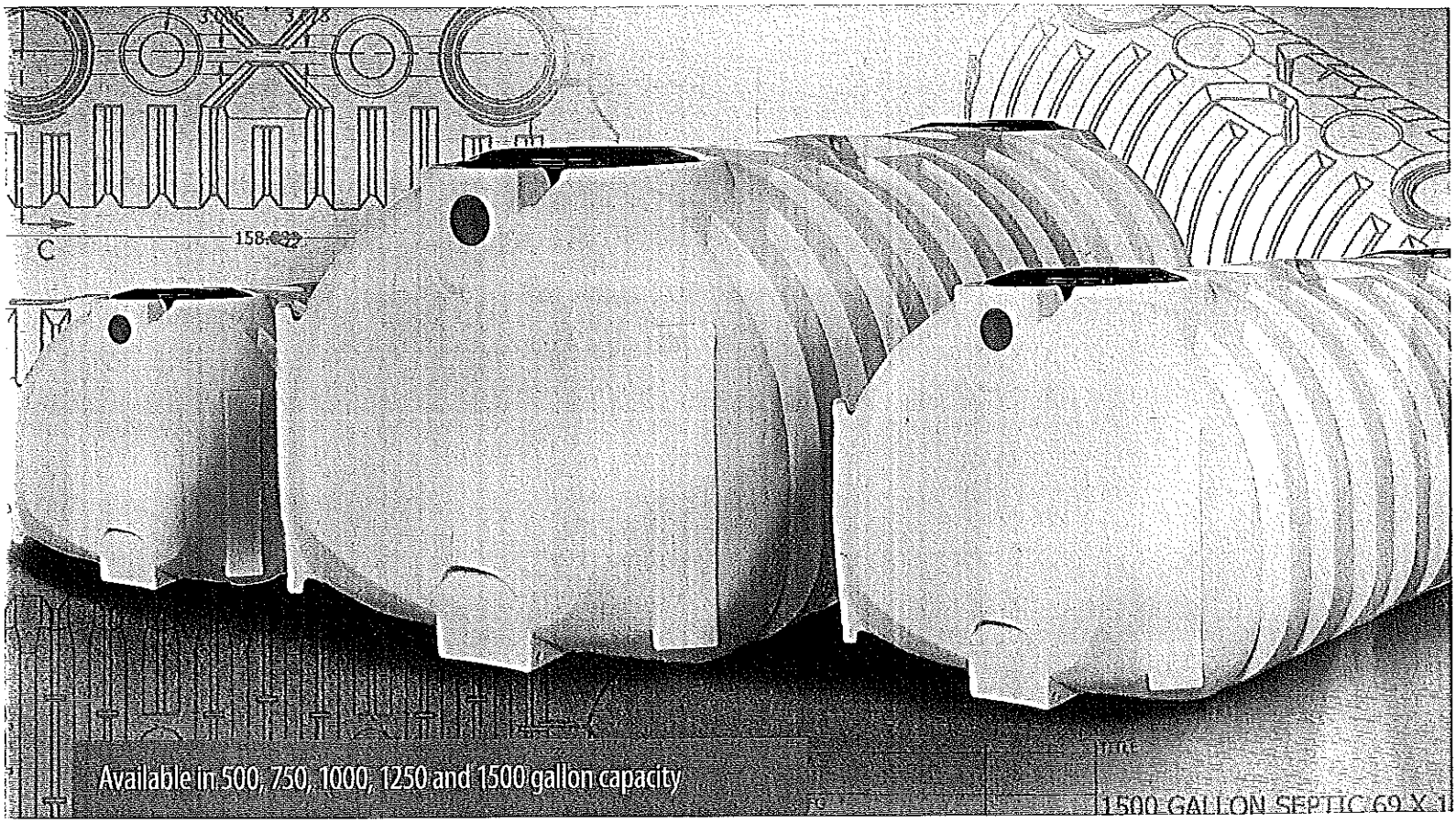
CSA Standard B66-10 - Design, material, and manufacturing requirements for prefabricated septic tanks and sewage holding tanks.

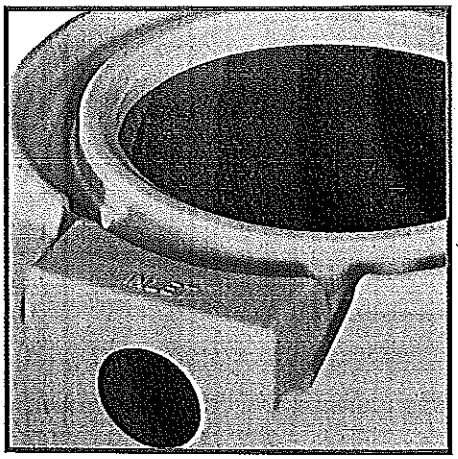
MARKINGS

See report.

Strength, Convenience And Value

Introducing Norwesco's New Low Profile Septic Tanks





- ☑ Rotationally molded rugged one-piece tank with no seams to leak
- ☑ No assembly required, reducing installation time and effort
- ☑ No special backfill or water filling required during installation
- ☑ May be pumped dry during pump-outs
- ☑ May be installed with 6" to 36" of cover
- ☑ Suitable for use as a septic tank, pump tank and may be used for non-potable water
- ☑ Available in both one and two-compartment configurations
- ☑ Access openings and lids accept Norwesco manhole extension, double-wall corrugated pipe and ribbed PVC pipe

NORWESCO

Installation Ready!

Norwesco's LP Septic Tanks Are Shipped To You, Ready For Installation

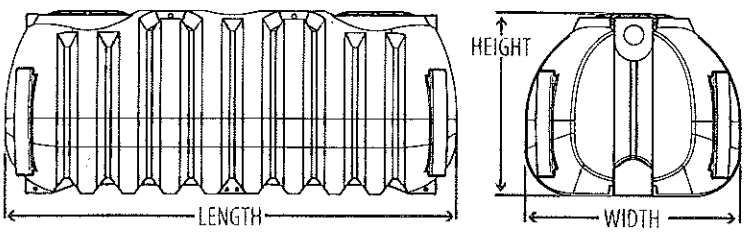
Norwesco Low Profile Septics Tanks are molded in one piece, requiring no additional assembly, reducing your installation time and effort.

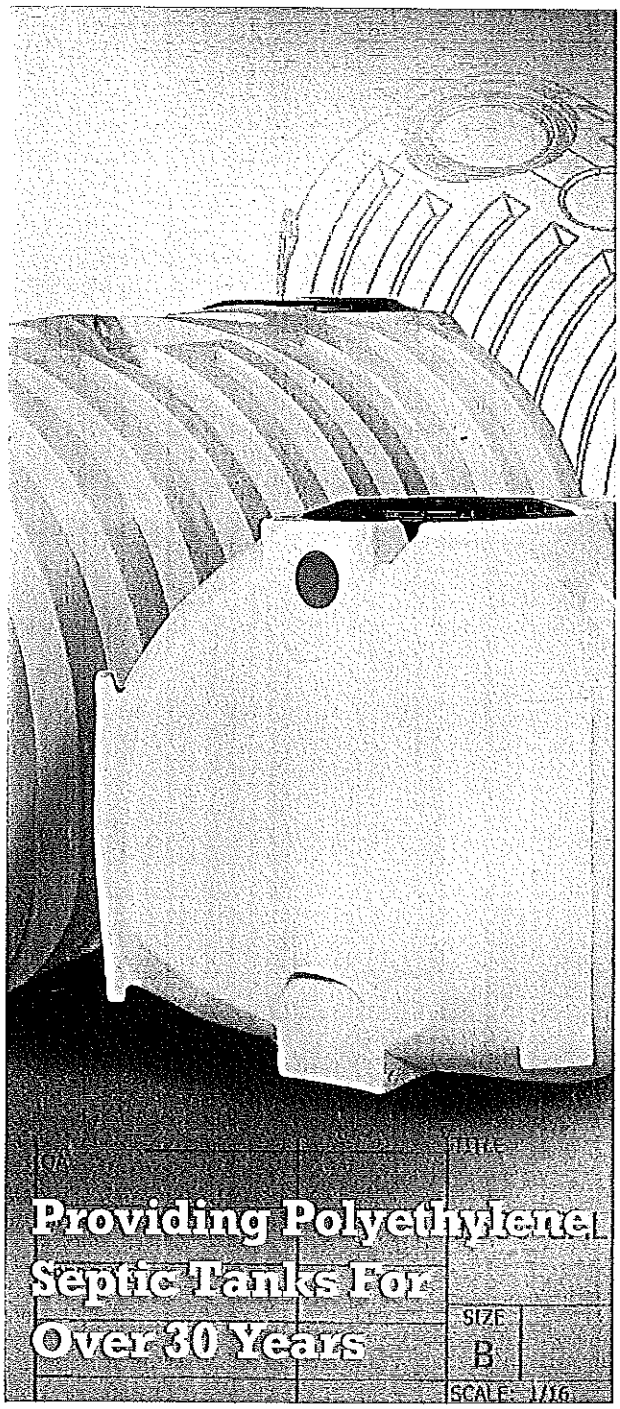
Strong Watertight Lid

Norwesco Low Profile Septic Tanks are equipped with domed lids. This design is significantly stronger than other lid designs. When leaving our factory, the lid is attached to the tank with stainless steel screws and comes standard with a gasket between the lid and the tank, providing a watertight seal.

Size Availability

GALLON CAPACITY	LENGTH	HEIGHT	WIDTH
500	97"	42"	48"
750	92"	51"	60"
1000	127"	51"	60"
1250	157"	50"	60"
1500	158"	50"	69"





NORWESCO
4365 Steiner Street P.O. Box 439
St. Bonifacious, MN 55375-0439
Voice: 800-328-3420 Fax: 800-874-2371

www.norwesco.com

ENTEGEE®
Engineering Technical Group

3530 Digital Drive
Dubuque, IA 52003

(563) 582-1741
(800) 397-5897

Date: January 24, 2011

Entegee Project: 24283

For: Norwesco, Inc
4365 Steiner St
St. Bonifacius, MN 55375

Contact: Todd Bolzer

Background: Norwesco, Inc. submitted one 750 gallon polyethylene septic tank solid model (Autodesk Inventor part file "750 2010 IAPMO 12-09-10 Full Model.ipt") for structural calculations per IAPMO/ANSI Z1000-2007. Material tensile test data was provided in file "S-2007-0700820.xls."

Purpose: To perform finite element analysis of the septic tank to verify that the design meets the requirements specified in paragraphs 3.6 and 3.7 of the IAPMO/ANSI standard. To provide the results of these calculations signed by a registered professional engineer, per paragraph 3.1 of the standard.

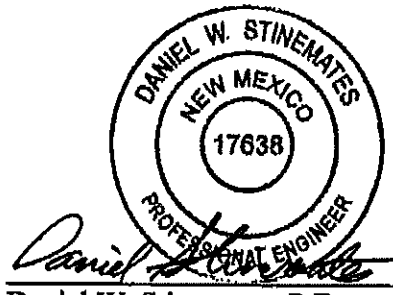
Referenced Standard: IAPMO/ANSI Z1000-2007

Analysis Software: NEiNastran v9.2.3.553 (FE solver)
FEMAP 10.1.0 (pre- and post- processing)

Analysis Methods: A half-symmetry finite element model was created and analyzed as described on the following pages.

Analysis Results: The analysis results are provided on the following pages.

Conclusion: The 750 gallon polyethylene septic tank, solid model "750 2010 IAPMO 12-09-10 Full Model.ipt", meets the requirements of IAPMO/ANSI Z1000-2007 per paragraphs 3.6 and 3.7.



Daniel W. Stinemates, P.E.

Attachment: Tank Drawing 750 x 60 x 92

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3530 Digital Drive (563) 582-1741
Dubuque, IA 52003 (800) 397-5897

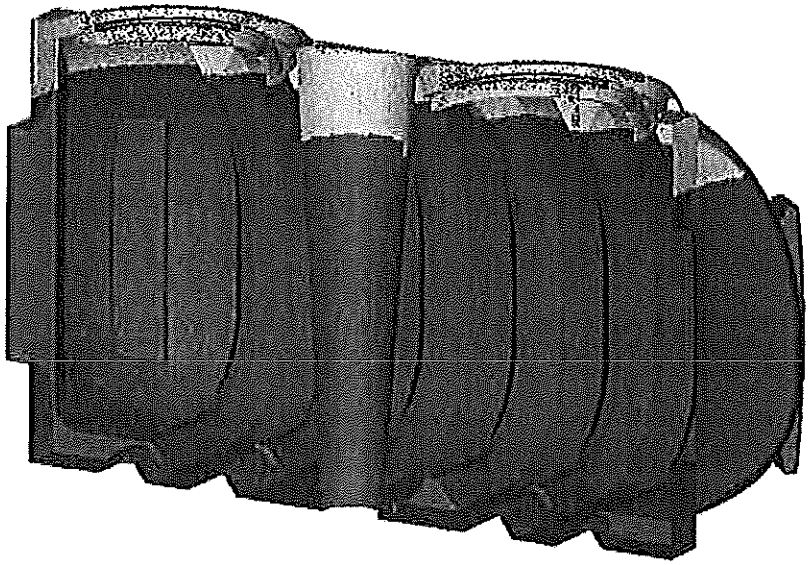
Analysis methods:
The solid model of the tank was imported via STEP format into FEMAP for preprocessing. The model was sliced lengthwise to create a half-symmetry model. The external surfaces of the solid tank were meshed with linear shell elements with a specified thickness of 0.25". Linear elastic material properties approximating the pre-yield behavior of polyethylene were assigned to the model. Loads and constraints were applied for the three load cases: 1. internal hydrostatic water pressure; 2. external hydrostatic pressure exerted by a fluid with a density of 30 lb/ft^3; 3. vertical earth load. Linear static analyses were performed with NEiNastran, and the results were post-processed in FEMAP. In some cases with high stresses, nonlinear elastic material properties were assigned and nonlinear analysis was run.

Acceptance criteria:
Analogous to paragraph 5.1.2 for physical testing, the tank is considered to have failed the analysis if a) ultimate material failure is predicted, or b) deformation greater than 5% of the tank's original dimensions (length, width, height) is predicted.

Load case 1: internal hydrostatic water pressure
From paragraph 3.6, "Exterior walls shall be designed for a minimum inside hydrostatic water pressure equal to the head pressure based upon the height of the outlet."

COMPLIES

Applied loads: Pressure loads were applied on the inner faces of the elements shown in purple, the top of which is approximately at the outlet height. The loads were directed outward perpendicular to each element face. The magnitude of the pressure load increases linearly as a function of water density and depth from the outlet height.



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Dubuque, IA 52003

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Constraints: Symmetry constraints (XSymm) were applied to the nodes on the cut center plane. Nodes on the longitudinal center line were constrained in the Z direction to prevent rigid body motion. Nodes on the bottom surfaces, shown in orange, were constrained in the vertical (Y) direction.

Results: The linear analysis predicts stresses above the yield strength of the material in a few areas. Some small scale material yield may occur in the tank, but no material failure is expected. Maximum change in overall tank length, width, or height compared to original dimensions is about 2.3% increase in length, which is below the maximum allowable 5%.

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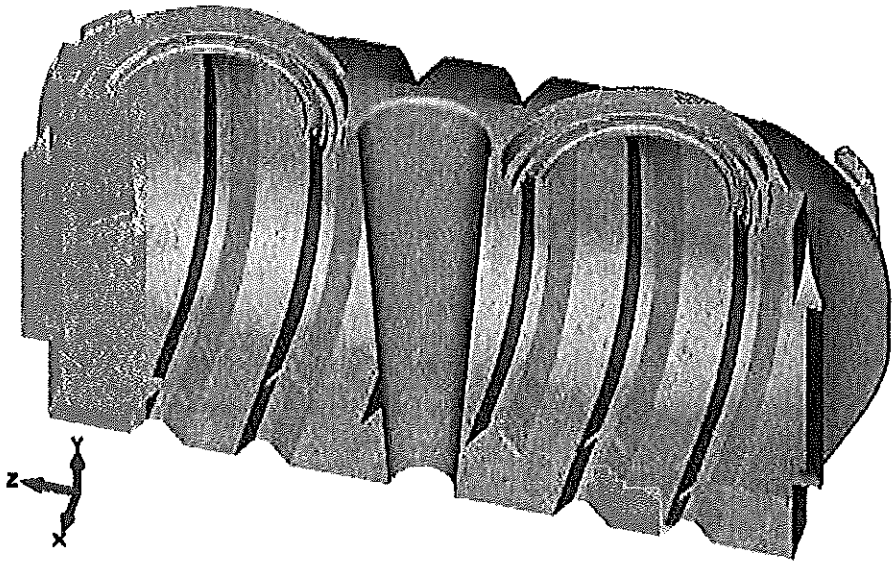
(800) 397-5897

Load case 2: external hydrostatic pressure

From paragraph 3.6, "The external walls shall also be designed to withstand a minimum outside earth pressure equivalent to that exerted by a fluid with a density of 30 lbs/ft^3 (481 kg/m^3)." **COMPLIES**

Applied loads: Pressure loads were applied to all surfaces of the tank. The loads were directed inward perpendicular to each element face. The magnitude of the pressure load increases linearly as a function of fluid density of 30 lbs/ft^3 and depth from the top of the tank.

Constraints: Symmetry constraints (XSymm) were applied to the nodes on the cut center plane. Nodes on the longitudinal center line were constrained in the Z direction to prevent rigid body motion. Nodes on the surfaces around the two top openings, shown in orange, were constrained in the vertical (Y) direction.



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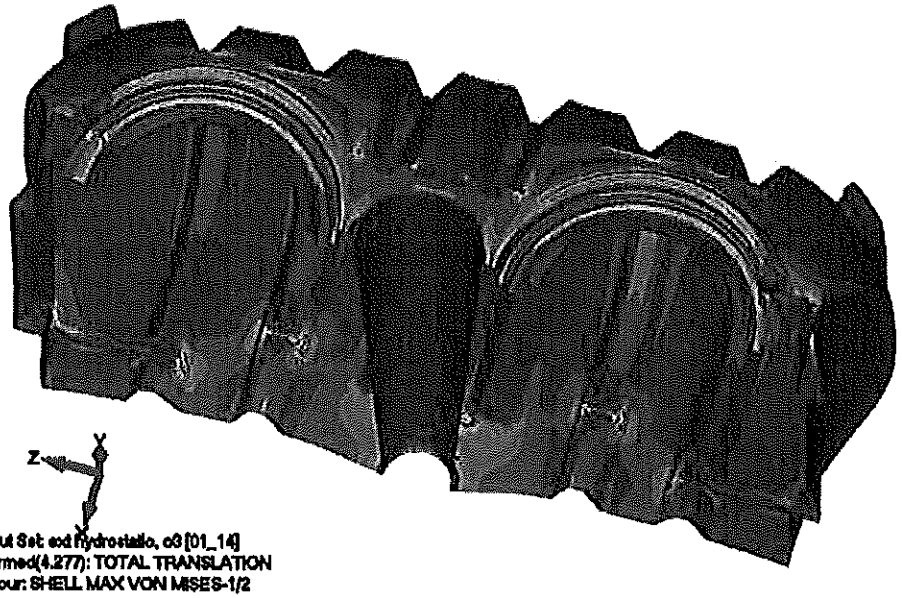
(563) 582-1741
(800) 397-5897

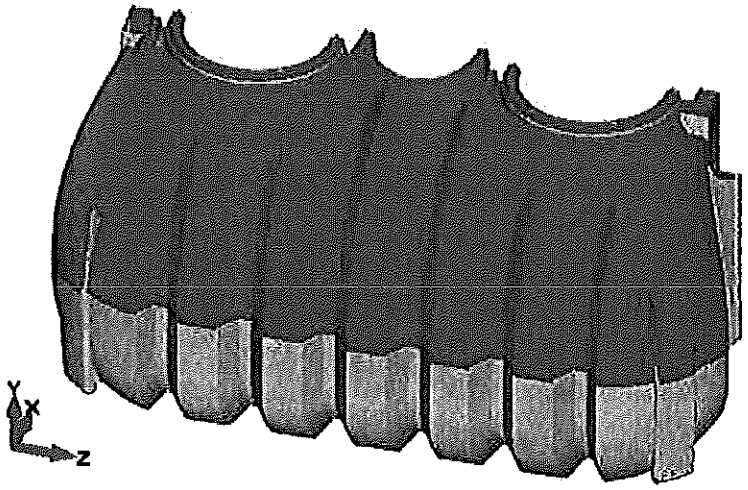
Results: The linear analysis predicts stresses above the yield strength of the material in a few areas. Some small scale material yield may occur in the tank, but no material failure is expected. Maximum change in overall tank width is about 4.1%.



Load case 3: vertical earth load

From paragraph 3.7, "Septic tanks and covers shall be designed for a vertical earth load of not less than five hundred (500) lbs/ft^2 (24 kPa) when the maximum coverage does not exceed 3 ft. (0.9 m)." **COMPLIES**

Applied loads: Vertical forces (in –Y direction) based on a pressure of 500 lb/ft^2 and the projected elemental horizontal areas were applied to the top surfaces shown in red.



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Dubuque, IA 52003

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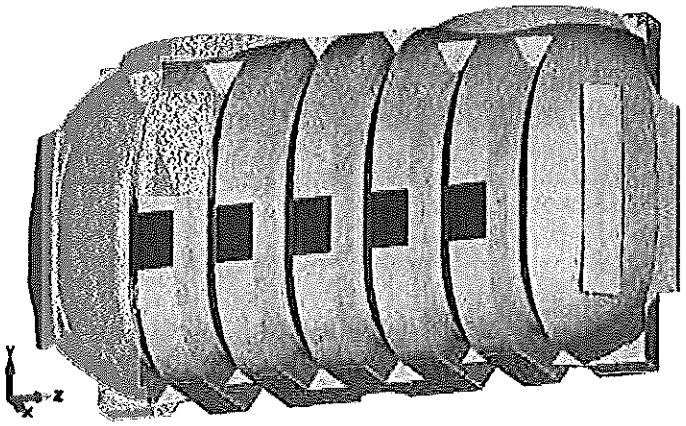
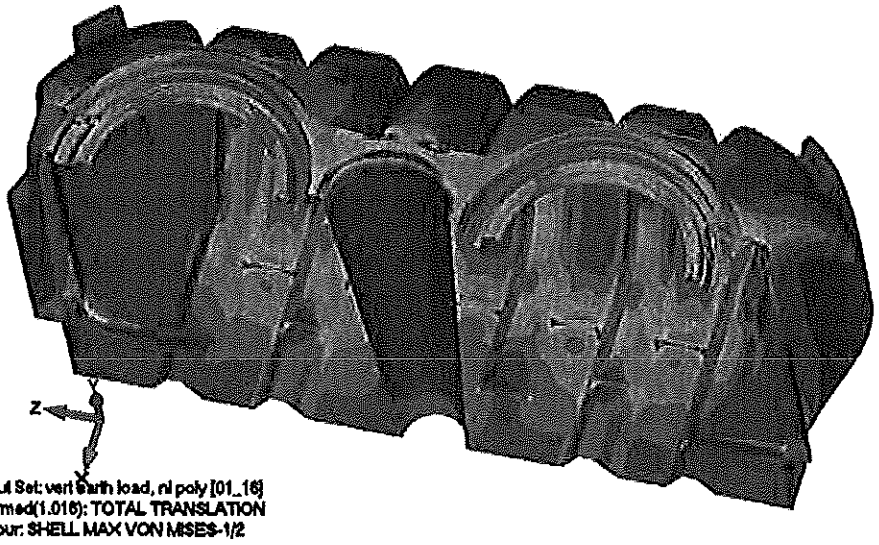
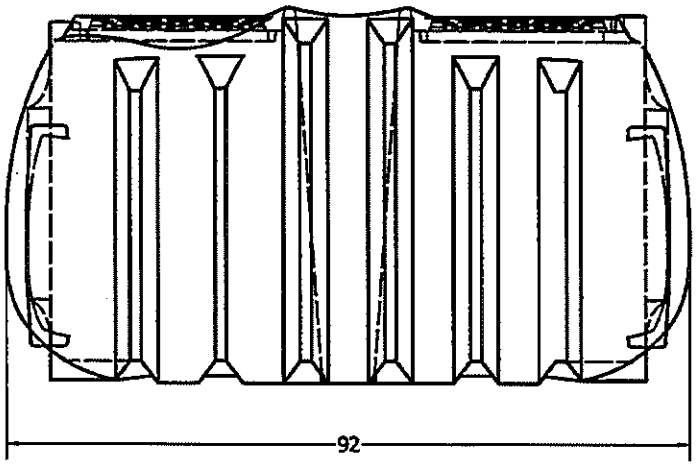
Constraints: Symmetry constraints (XSymm) were applied to the nodes on the cut center plane. Nodes on the longitudinal center line were constrained in the Z direction to prevent rigid body motion. Nodes on the bottom surfaces, shown in orange, were constrained in the vertical (Y) direction. Nodes on the side vertical surfaces, shown in dark blue, were constrained in the lateral (X) direction to account for support from the surrounding soil.

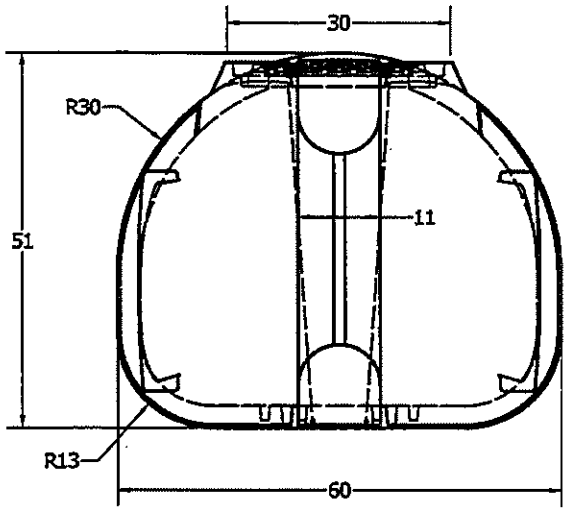


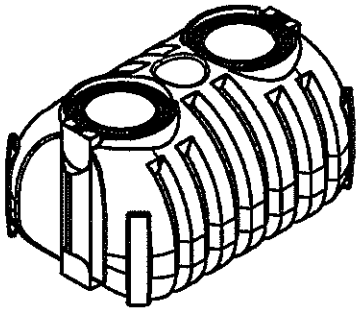
Results: The nonlinear analysis does not predict any significant areas with stresses above the yield strength of the material. Some small scale material yield may occur in the tank, but no material failure is expected. Maximum change in overall tank length compared to original dimensions is less than 2%, which is below the maximum allowable 5%.
Note: Without the lateral supports from the surrounding soil (blue areas on constraint plot), higher stresses and deflections are expected with this loading.



REVISION HISTORY				
ZONE	REV	DESCRIPTION	DATE	APPROVED







DRAWN Todd Bolzer	12/28/2010	NORWESCO, INC., ST. BONIFACIUS, MN
CHECKED		TITLE: 750 LOW PROFILE SEPTIC
QA		
MFG		
APPROVED		

SIZE	DWG NO	REV
B	750 x 60 x 92	

SCALE: 1/16 SHEET 1 OF 1

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3530 Digital Drive
Dubuque, IA 52003

(563) 582-1741
(800) 397-5897

Date: January 24, 2011

Entegee Project: 24283

For: Norwesco, Inc
4365 Steiner St
St. Bonifacius, MN 55375

Contact: Todd Bolzer

Background: Norwesco, Inc. submitted one 1,000 gallon polyethylene septic tank solid model (Autodesk Inventor part file "1000 x 60 x 127 Prism End.ipt") for structural calculations per IAPMO/ANSI Z1000-2007. Material tensile test data was provided in file "S-2007-0700820.xls."

Purpose: To perform finite element analysis of the septic tank to verify that the design meets the requirements specified in paragraphs 3.6 and 3.7 of the IAPMO/ANSI standard. To provide the results of these calculations signed by a registered professional engineer, per paragraph 3.1 of the standard.

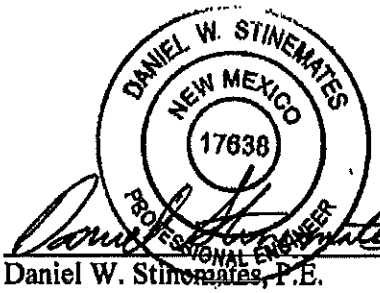
Referenced Standard: IAPMO/ANSI Z1000-2007

Analysis Software: NEiNastran v9.2.3.553 (FE solver)
FEMAP 10.1.0 (pre- and post- processing)

Analysis Methods: A half-symmetry finite element model was created and analyzed as described on the following pages.

Analysis Results: The analysis results are provided on the following pages.

Conclusion: The 1,000 gallon polyethylene septic tank, solid model "1000 x 60 x 127 Prism End.ipt", meets the requirements of IAPMO/ANSI Z1000-2007 per paragraphs 3.6 and 3.7.



Daniel W. Stinemates, P.E.

Attachment: Tank Drawing 1000 x 60 x 127

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Dubuque, IA 52003
(563) 582-1741
(800) 397-5897

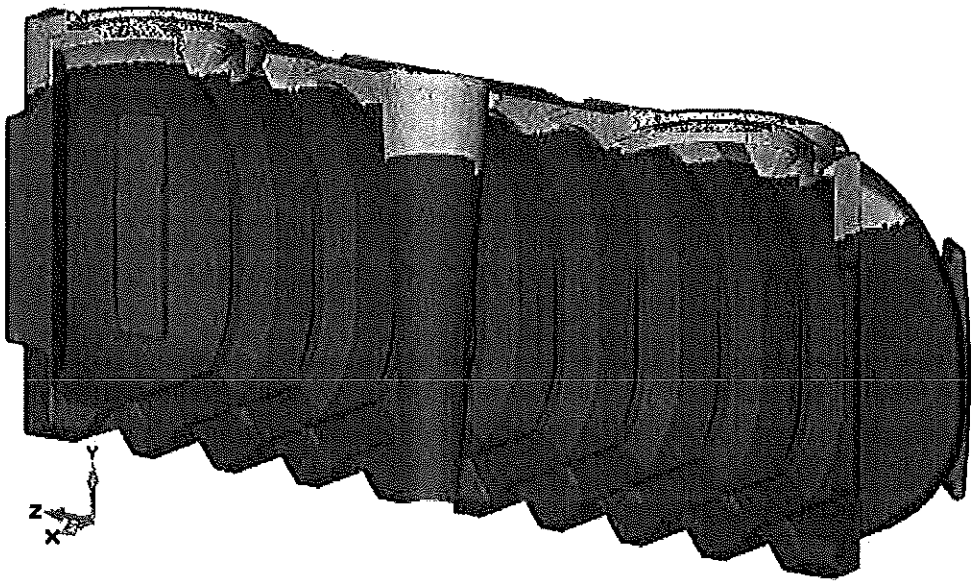
Analysis methods:
The solid model of the tank was imported via STEP format into FEMAP for preprocessing. The model was sliced lengthwise to create a half-symmetry model. The external surfaces of the solid tank were meshed with linear shell elements with a specified thickness of 0.25". Linear elastic material properties approximating the pre-yield behavior of polyethylene were assigned to the model. Loads and constraints were applied for the three load cases: 1. internal hydrostatic water pressure; 2. external hydrostatic pressure exerted by a fluid with a density of 30 lb/ft^3; 3. vertical earth load. Linear static analyses were performed with NEiNastran, and the results were post-processed in FEMAP.

Acceptance criteria:
Analogous to paragraph 5.1.2 for physical testing, the tank is considered to have failed the analysis if a) ultimate material failure is predicted, or b) deformation greater than 5% of the tank's original dimensions (length, width, height) is predicted.

Load case 1: internal hydrostatic water pressure
From paragraph 3.6, "Exterior walls shall be designed for a minimum inside hydrostatic water pressure equal to the head pressure based upon the height of the outlet."

COMPLIES

Applied loads: Pressure loads were applied on the inner faces of the elements shown in purple, the top of which is approximately at the outlet height. The loads were directed outward perpendicular to each element face. The magnitude of the pressure load increases linearly as a function of water density and depth from the outlet height.



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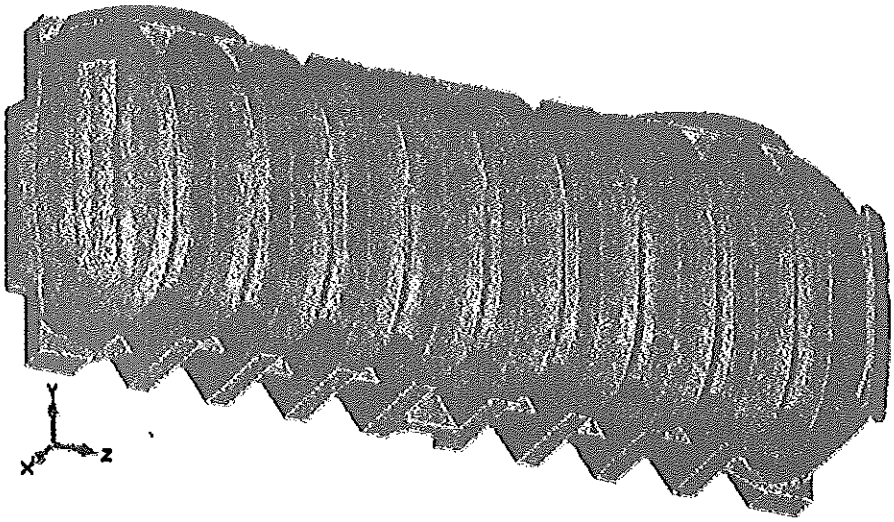
(563) 582-1741
(800) 397-5897

Constraints: Symmetry constraints (XSymm) were applied to the nodes on the cut center plane. Nodes on the longitudinal center line were constrained in the Z direction to prevent rigid body motion. Nodes on the bottom surfaces, shown in orange, were constrained in the vertical (Y) direction.



Results: The linear analysis predicts stresses above the yield strength of the material in a few areas. Some small scale material yield may occur in the tank, but no material failure is expected. Maximum change in overall tank length, width, or height compared to original dimensions is about 3.2% increase in length, which is below the maximum allowable 5%.

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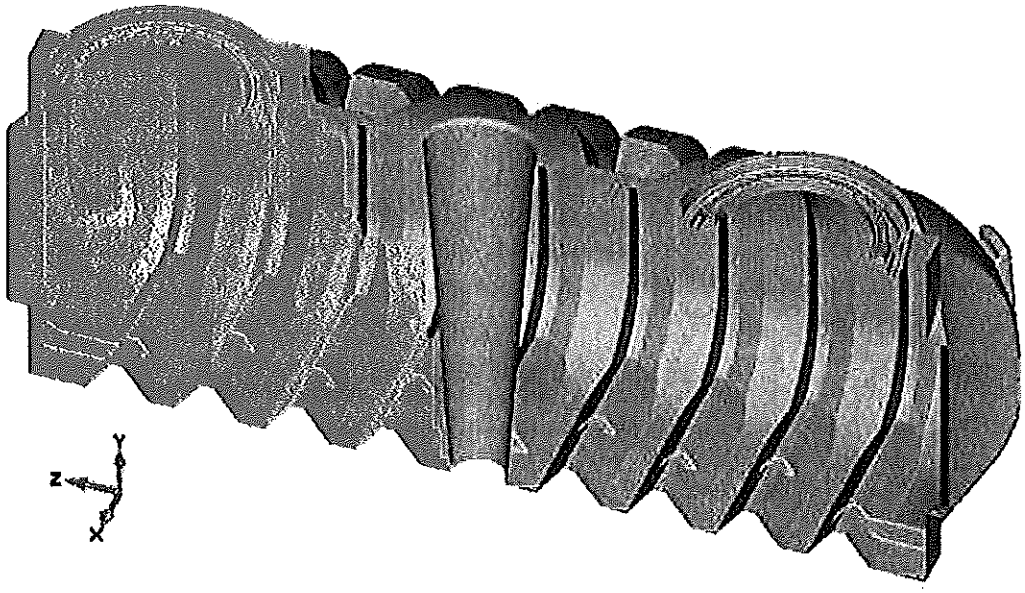
3530 Digital Drive (563) 582-1741
Dubuque, IA 52003 (800) 397-5897

Load case 2: external hydrostatic pressure

From paragraph 3.6, "The external walls shall also be designed to withstand a minimum outside earth pressure equivalent to that exerted by a fluid with a density of 30 lbs/ft^3 (481 kg/m^3)." **COMPLIES**

Applied loads: Pressure loads were applied to all surfaces of the tank. The loads were directed inward perpendicular to each element face. The magnitude of the pressure load increases linearly as a function of fluid density of 30 lbs/ft^3 and depth from the top of the tank.

Constraints: Symmetry constraints (XSymm) were applied to the nodes on the cut center plane. Nodes on the longitudinal center line were constrained in the Z direction to prevent rigid body motion. Nodes on the surfaces around the two top openings, shown in orange, were constrained in the vertical (Y) direction.



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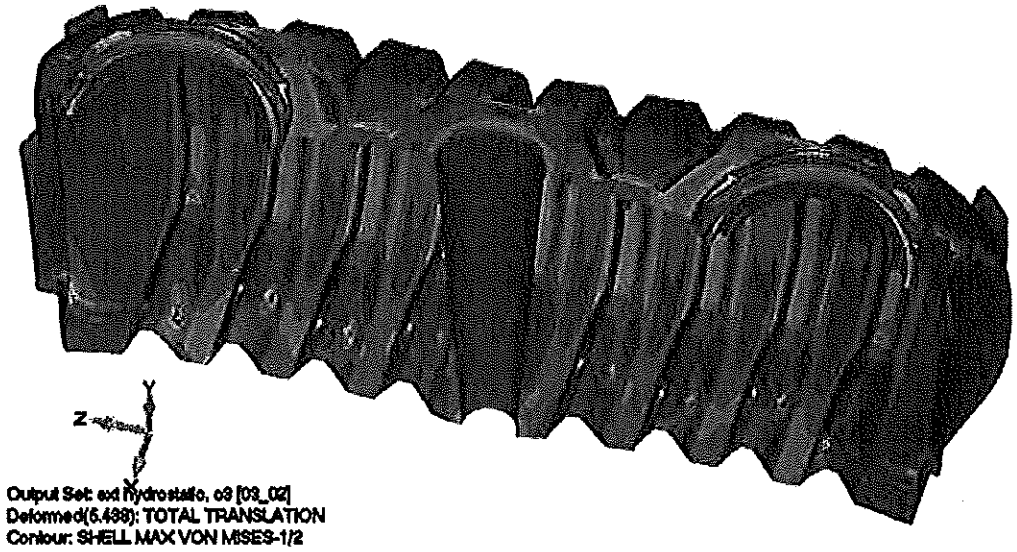
Dubuque, IA 52003 (800) 397-5897

Results: The linear analysis predicts stresses above the yield strength of the material in a few areas. Some small scale material yield may occur in the tank, but no material failure is expected. Maximum change in overall tank width is close to the maximum allowable of 5%.



Load case 3: vertical earth load

From paragraph 3.7, "Septic tanks and covers shall be designed for a vertical earth load of not less than five hundred (500) lbs/ft^2 (24 kPa) when the maximum coverage does not exceed 3 ft. (0.9 m)." **COMPLIES**

Applied loads: Vertical forces (in –Y direction) based on a pressure of 500 lb/ft^2 and the projected elemental horizontal areas were applied to the top surfaces shown in red.

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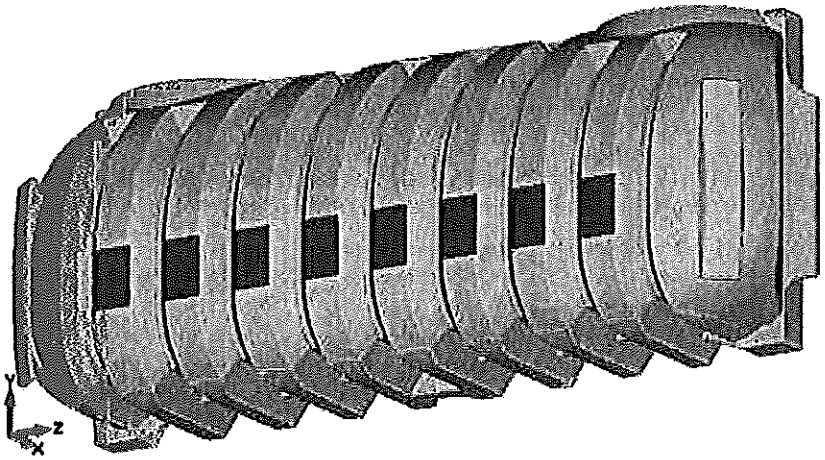
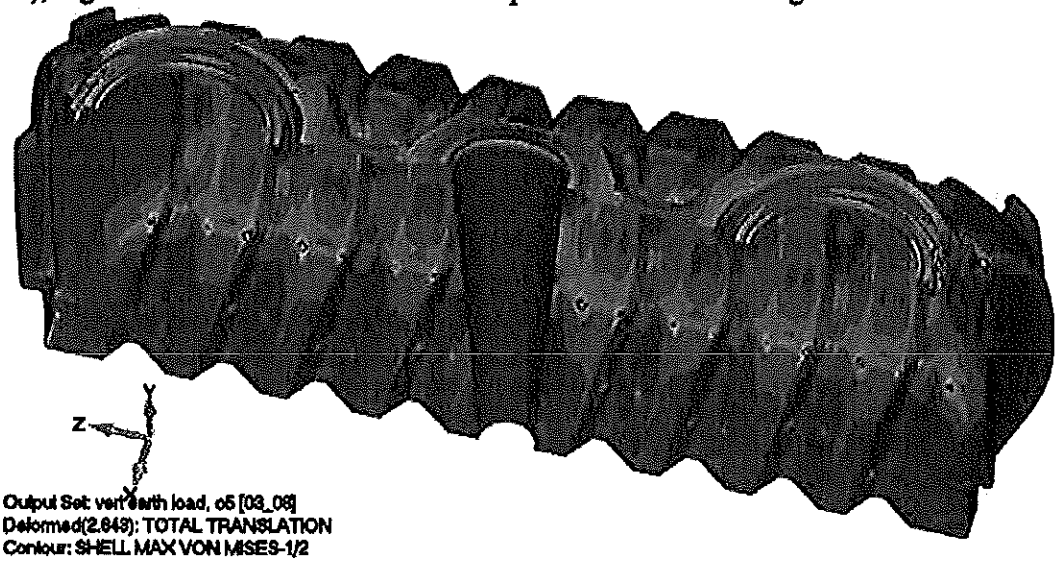
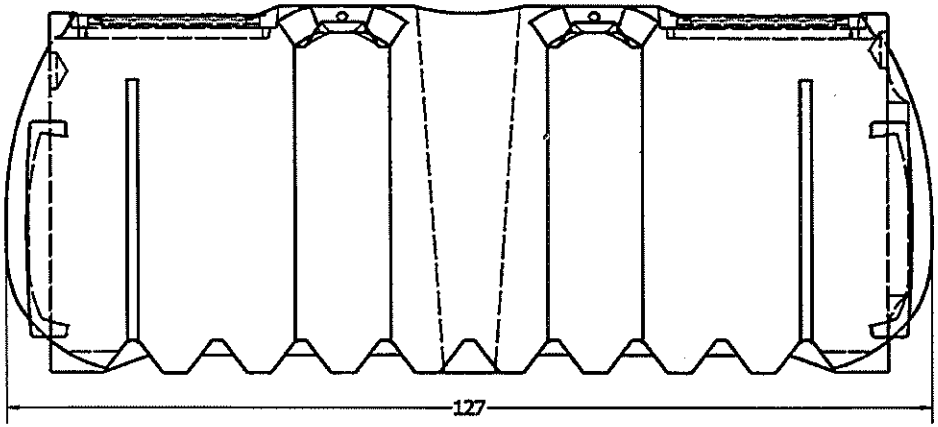
Constraints: Symmetry constraints (XSymm) were applied to the nodes on the cut center plane. Nodes on the longitudinal center line were constrained in the Z direction to prevent rigid body motion. Nodes on the bottom surfaces, shown in orange, were constrained in the vertical (Y) direction. Nodes on the side vertical surfaces, shown in dark blue, were constrained in the lateral (X) direction to account for support from the surrounding soil.

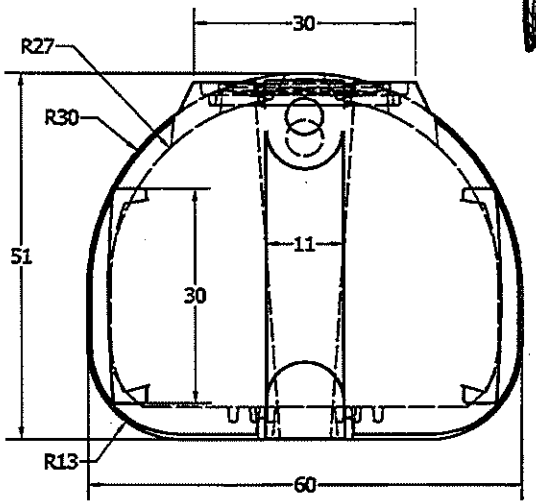


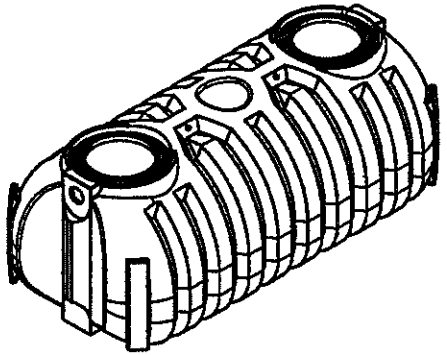
Results: The linear analysis predicts stresses above the yield strength of the material in a few areas. Some small scale material yield may occur in the tank, but no material failure is expected. Maximum change in overall tank length compared to original dimensions is less than 2%, which is below the maximum allowable 5%.
Note: Without the lateral supports from the surrounding soil (blue areas on constraint plot), higher stresses and deflections are expected with this loading.

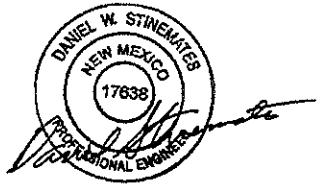


REVISION HISTORY				
ZONE	REV	DESCRIPTION	DATE	APPROVED









DRAWN Todd Bolzer	12/28/2010	NORWESCO, INC., ST. BONIFACIUS, MN
CHECKED		TITLE: 1000 LOW PROFILE SEPTIC
QA		
MFG		
APPROVED		SIZE: B; DWG NO: 1000 x 60 x 127; REV:
		SCALE: 1/16; SHEET 1 OF 1

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Date: January 24, 2011

Entegee Project: 24283

For: Norwesco, Inc
4365 Steiner St
St. Bonifacius, MN 55375

Contact: Todd Bolzer

Background: Norwesco, Inc. submitted one 1,250 gallon polyethylene septic tank solid model (Autodesk Inventor part file "1250 x 60 x 157 12-15-10.ipt") for structural calculations per IAPMO/ANSI Z1000-2007. Material tensile test data was provided in file "S-2007-0700820.xls."

Purpose: To perform finite element analysis of the septic tank to verify that the design meets the requirements specified in paragraphs 3.6 and 3.7 of the IAPMO/ANSI standard. To provide the results of these calculations signed by a registered professional engineer, per paragraph 3.1 of the standard.

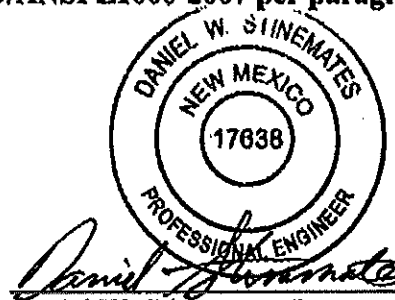
Referenced Standard: IAPMO/ANSI Z1000-2007

Analysis Software: NEiNastran v9.2.3.553 (FE solver)
FEMAP 10.1.0 (pre- and post- processing)

Analysis Methods: A half-symmetry finite element model was created and analyzed as described on the following pages.

Analysis Results: The analysis results are provided on the following pages.

Conclusion: The 1,250 gallon polyethylene septic tank, solid model "1250 x 60 x 157 12-15-10.ipt", meets the requirements of IAPMO/ANSI Z1000-2007 per paragraphs 3.6 and 3.7.



Daniel W. Stinemates, P.E.

Attachment: Tank drawing 1250 x 60 x 157

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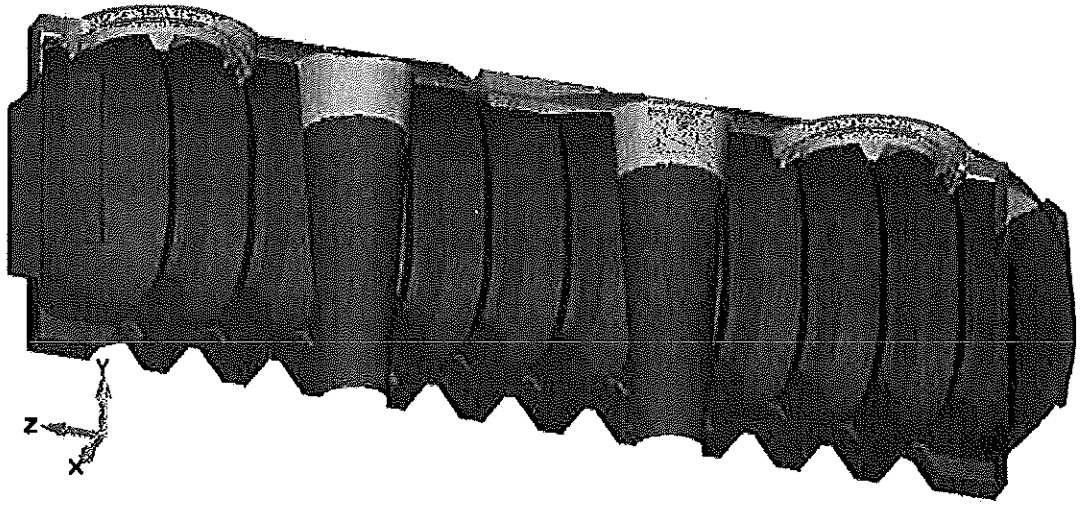
Analysis methods:
The solid model of the tank was imported via STEP format into FEMAP for preprocessing. The model was sliced lengthwise to create a half-symmetry model. The external surfaces of the solid tank were meshed with linear shell elements with a specified thickness of 0.25". Linear elastic material properties approximating the pre-yield behavior of polyethylene were assigned to the model. Loads and constraints were applied for the three load cases: 1. internal hydrostatic water pressure; 2. external hydrostatic pressure exerted by a fluid with a density of 30 lb/ft^3; 3. vertical earth load. Linear static analyses were performed with NEiNastran, and the results were post-processed in FEMAP. In some cases with high stresses, nonlinear elastic material properties were assigned and nonlinear analysis was run.

Acceptance criteria:
Analogous to paragraph 5.1.2 for physical testing, the tank is considered to have failed the analysis if a) ultimate material failure is predicted, or b) deformation greater than 5% of the tank's original dimensions (length, width, height) is predicted.

Load case 1: internal hydrostatic water pressure
From paragraph 3.6, "Exterior walls shall be designed for a minimum inside hydrostatic water pressure equal to the head pressure based upon the height of the outlet."

COMPLIES

Applied loads: Pressure loads were applied on the inner faces of the elements shown in purple, the top of which is approximately at the outlet height. The loads were directed outward perpendicular to each element face. The magnitude of the pressure load increases linearly as a function of water density and depth from the outlet height.



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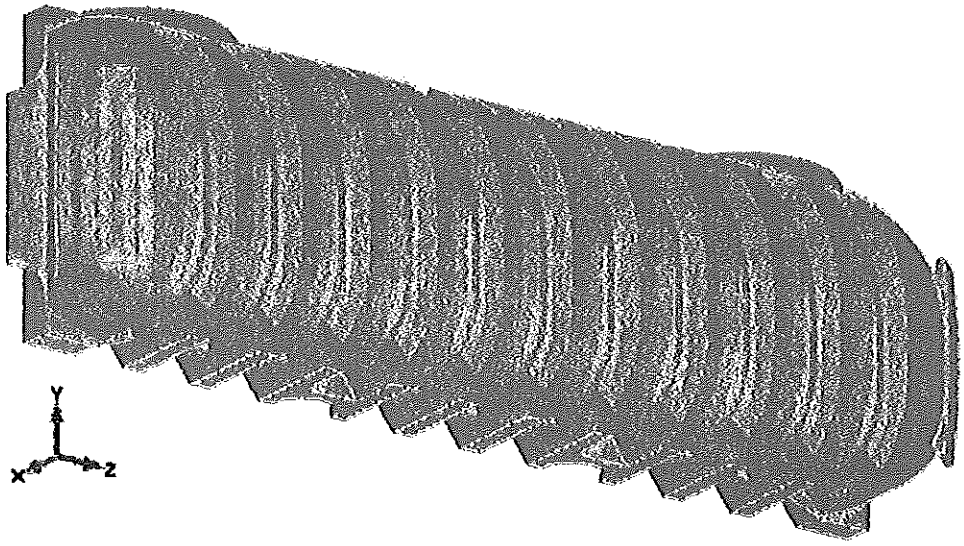
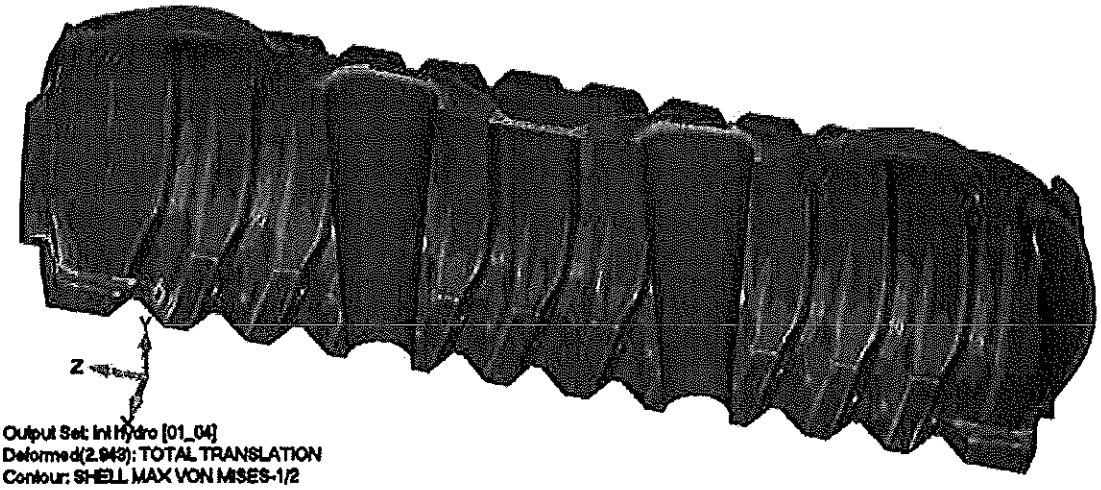
Constraints: Symmetry constraints (XSymm) were applied to the nodes on the cut center plane. Nodes on the longitudinal center line were constrained in the Z direction to prevent rigid body motion. Nodes on the bottom surfaces, shown in orange, were constrained in the vertical (Y) direction.



Results: The linear analysis predicts stresses above the yield strength of the material in a few areas. Some small scale material yield may occur in the tank, but no material failure is expected. Maximum change in overall tank length, width, or height compared to original dimensions is about 2.3% increase in length, which is below the maximum allowable 5%.



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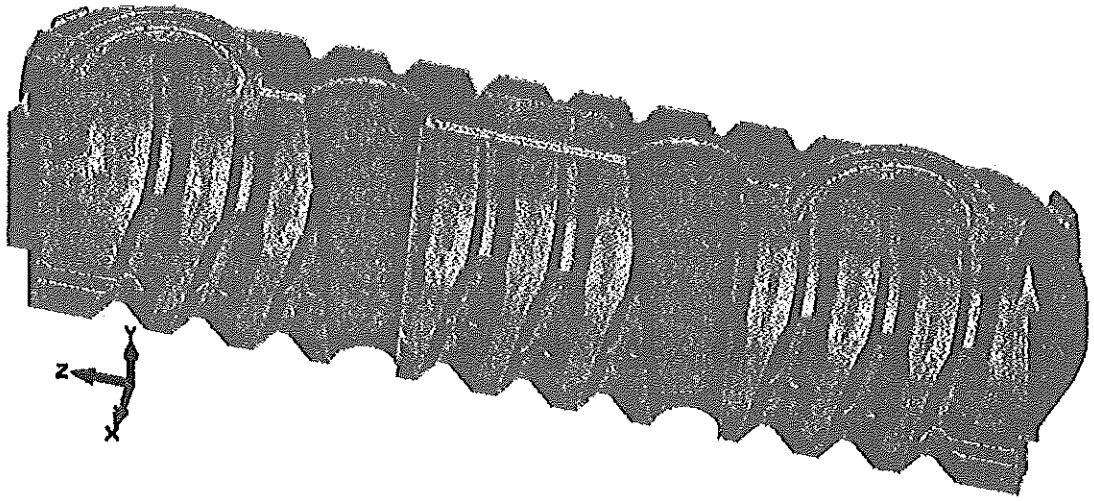
Load case 2: external hydrostatic pressure

From paragraph 3.6, "The external walls shall also be designed to withstand a minimum outside earth pressure equivalent to that exerted by a fluid with a density of 30 lbs/ft^3 (481 kg/m^3)." **COMPLIES**

Applied loads: Pressure loads were applied to all surfaces of the tank. The loads were directed inward perpendicular to each element face. The magnitude of the pressure load increases linearly as a function of fluid density of 30 lbs/ft^3 and depth from the top of the tank.

Constraints: Symmetry constraints (XSymm) were applied to the nodes on the cut center plane. Nodes on the longitudinal center line were constrained in the Z direction to prevent rigid body motion. Nodes on the surfaces around the two top openings and on the top middle surfaces near the centerline, shown in orange, were constrained in the vertical (Y) direction.



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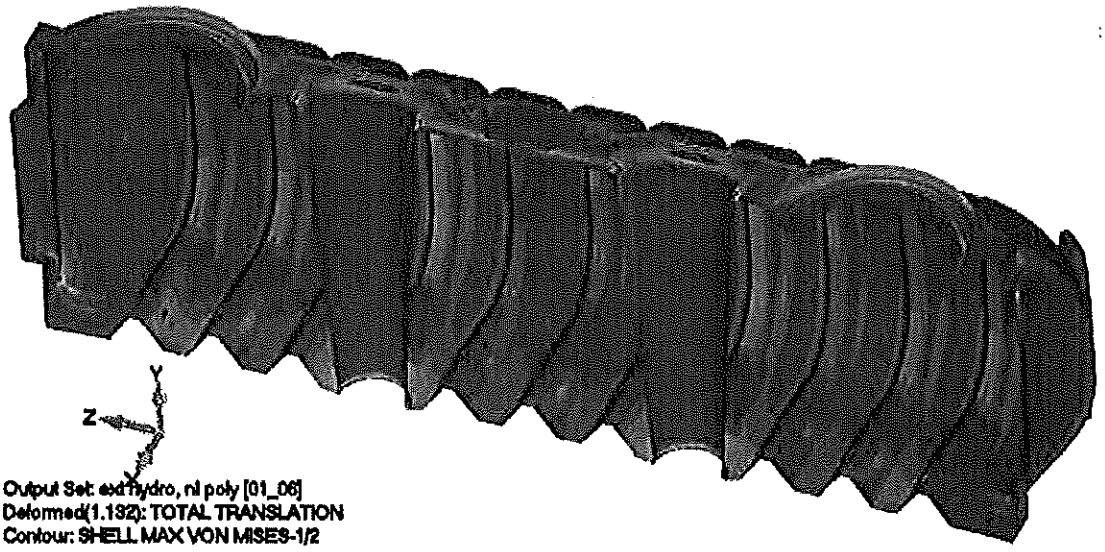
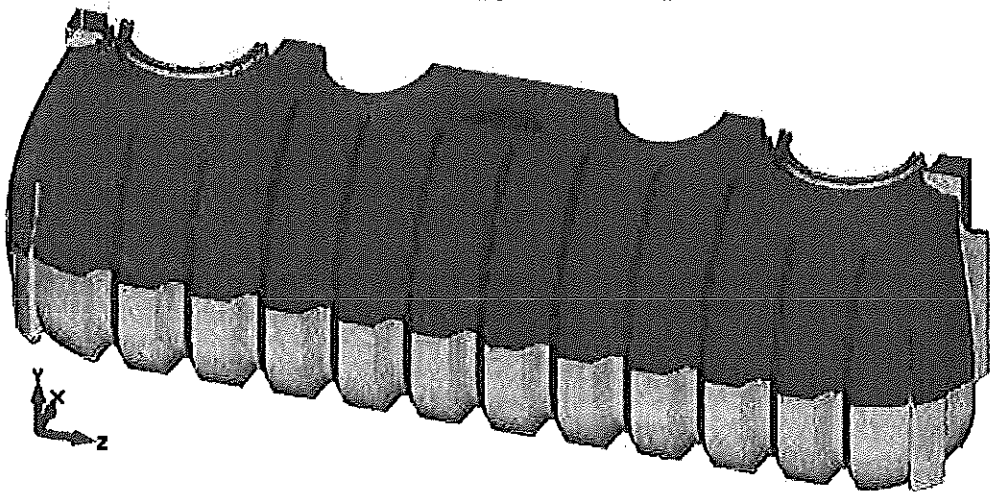
Results: The nonlinear analysis predicts only small areas of stresses above the yield strength of the material. Some small scale material yield may occur in the tank, but no material failure is expected. Maximum change in overall tank width is about 3.5%.



Load case 3: vertical earth load

From paragraph 3.7, "Septic tanks and covers shall be designed for a vertical earth load of not less than five hundred (500) lbs/ft^2 (24 kPa) when the maximum coverage does not exceed 3 ft. (0.9 m)." **COMPLIES**

Applied loads: Vertical forces (in –Y direction) based on a pressure of 500 lb/ft^2 and the projected elemental horizontal areas were applied to the top surfaces shown in red.



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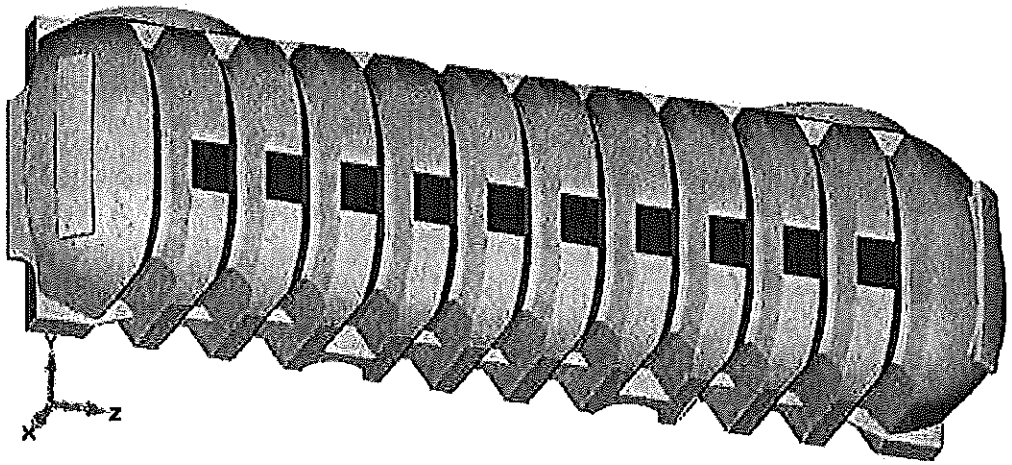
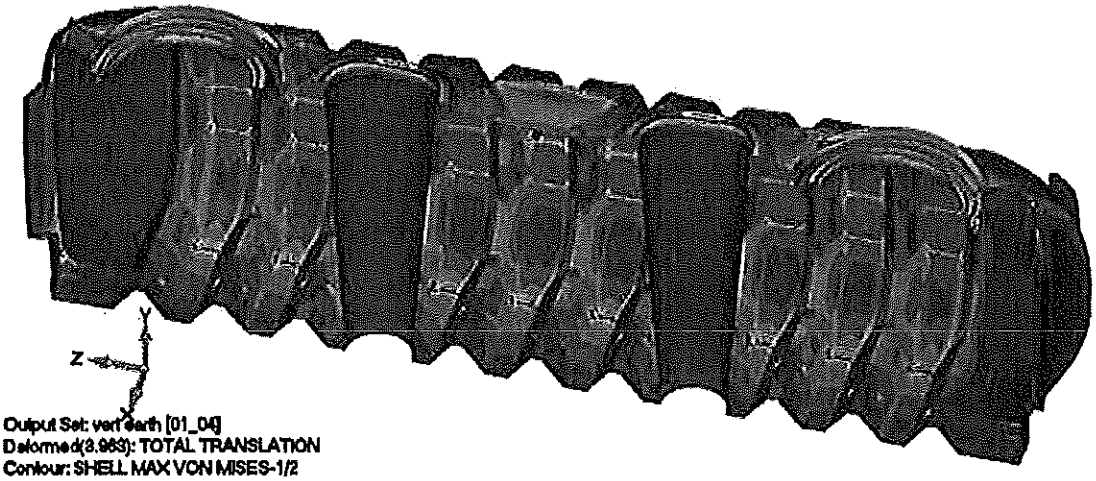
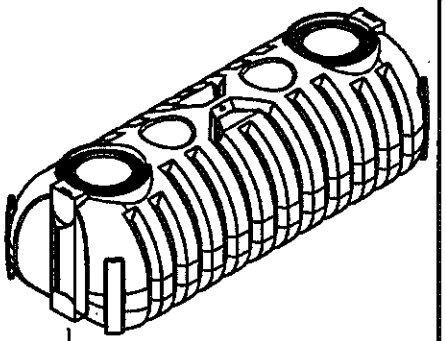
Constraints: Symmetry constraints (XSymm) were applied to the nodes on the cut center plane. Nodes on the longitudinal center line were constrained in the Z direction to prevent rigid body motion. Nodes on the bottom surfaces, shown in orange, were constrained in the vertical (Y) direction. Nodes on the side vertical surfaces, shown in dark blue, were constrained in the lateral (X) direction to account for support from the surrounding soil.

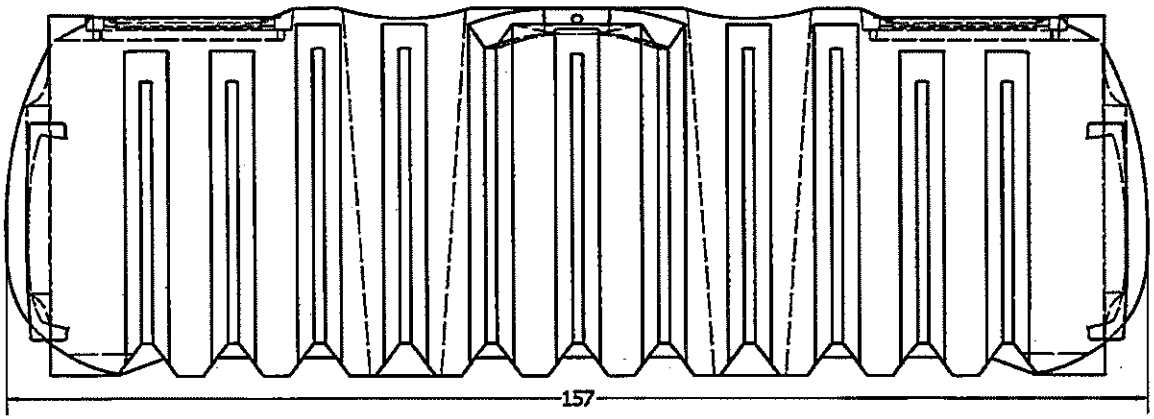


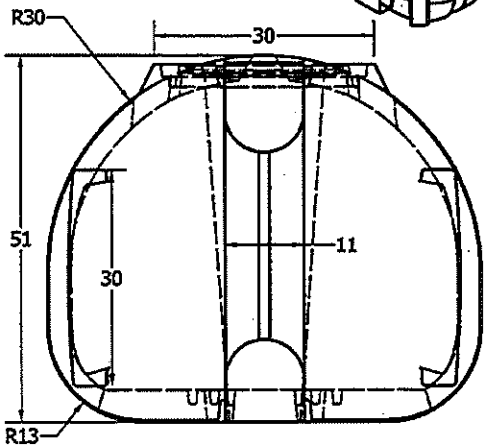
Results: The linear analysis predicts stresses above the yield strength of the material in a few areas. Some small scale material yield may occur in the tank, but no material failure is expected. Maximum change in overall tank length compared to original dimensions is less than 2%, which is below the maximum allowable 5%.
Note: Without the lateral supports from the surrounding soil (blue areas on constraint plot), higher stresses and deflections are expected with this loading.



REVISION HISTORY				
ZONE	REV	DESCRIPTION	DATE	APPROVED







DRAWN Todd Bolzer	12/28/2010	NORWESCO, INC., ST. BONIFACIUS, MN
CHECKED		TITLE: 1250 LOW PROFILE SEPTIC
QA		
MFG		
APPROVED		SIZE: B; DWG NO: 1250 x 60 x 157; REV:
		SCALE: 1/16; SHEET 1 OF 1

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Date: January 24, 2011

Entegee Project: 24283

For: Norwesco, Inc
4365 Steiner St
St. Bonifacius, MN 55375

Contact: Todd Bolzer

Background: Norwesco, Inc. submitted one 1,500 gallon polyethylene septic tank solid model (Autodesk Inventor part file "1500 New Flasco 11-04-10.ipt") for structural calculations per IAPMO/ANSI Z1000-2007. Material tensile test data was provided in file "S-2007-0700820.xls."

Purpose: To perform finite element analysis of the septic tank to verify that the design meets the requirements specified in paragraphs 3.6 and 3.7 of the IAPMO/ANSI standard. To provide the results of these calculations signed by a registered professional engineer, per paragraph 3.1 of the standard.

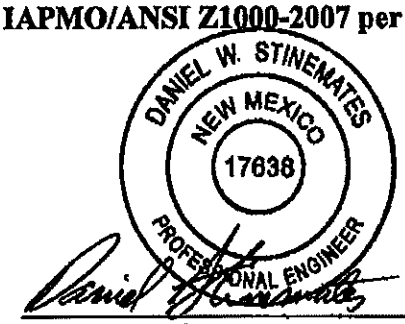
Referenced Standard: IAPMO/ANSI Z1000-2007

Analysis Software: NEiNastran v9.2.3.553 (FE solver)
FEMAP 10.1.0 (pre- and post- processing)

Analysis Methods: A half-symmetry finite element model was created and analyzed as described on the following pages.

Analysis Results: The analysis results are provided on the following pages.

Conclusion: The 1,500 gallon polyethylene septic tank, solid model "1500 New Flasco 11-04-10.ipt", meets the requirements of IAPMO/ANSI Z1000-2007 per paragraphs 3.6 and 3.7.



Daniel W. Stinemates, P.E.

Attachment: Tank drawing 1500 x 60 x 157

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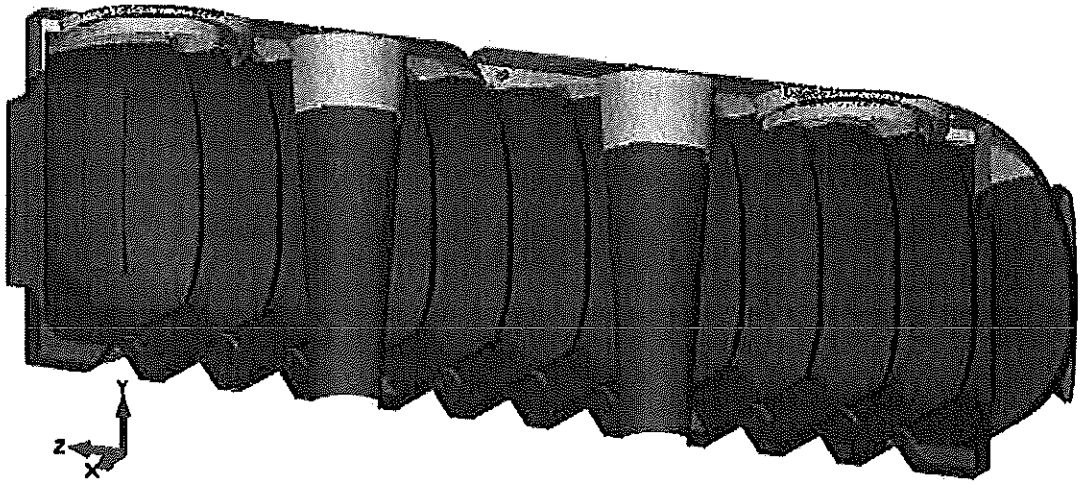
Analysis methods:
The solid model of the tank was imported via STEP format into FEMAP for preprocessing. The model was sliced lengthwise to create a half-symmetry model. The external surfaces of the solid tank were meshed with linear shell elements with a specified thickness of 0.25". Linear elastic material properties approximating the pre-yield behavior of polyethylene were assigned to the model. Loads and constraints were applied for the three load cases: 1. internal hydrostatic water pressure; 2. external hydrostatic pressure exerted by a fluid with a density of 30 lb/ft^3; 3. vertical earth load. Linear static analyses were performed with NEiNastran, and the results were post-processed in FEMAP. In some cases with high stresses, nonlinear elastic material properties were assigned and nonlinear analysis was run.

Acceptance criteria:
Analogous to paragraph 5.1.2 for physical testing, the tank is considered to have failed the analysis if a) ultimate material failure is predicted, or b) deformation greater than 5% of the tank's original dimensions (length, width, height) is predicted.

Load case 1: internal hydrostatic water pressure
From paragraph 3.6, "Exterior walls shall be designed for a minimum inside hydrostatic water pressure equal to the head pressure based upon the height of the outlet."

COMPLIES

Applied loads: Pressure loads were applied on the inner faces of the elements shown in purple, the top of which is approximately at the outlet height. The loads were directed outward perpendicular to each element face. The magnitude of the pressure load increases linearly as a function of water density and depth from the outlet height.



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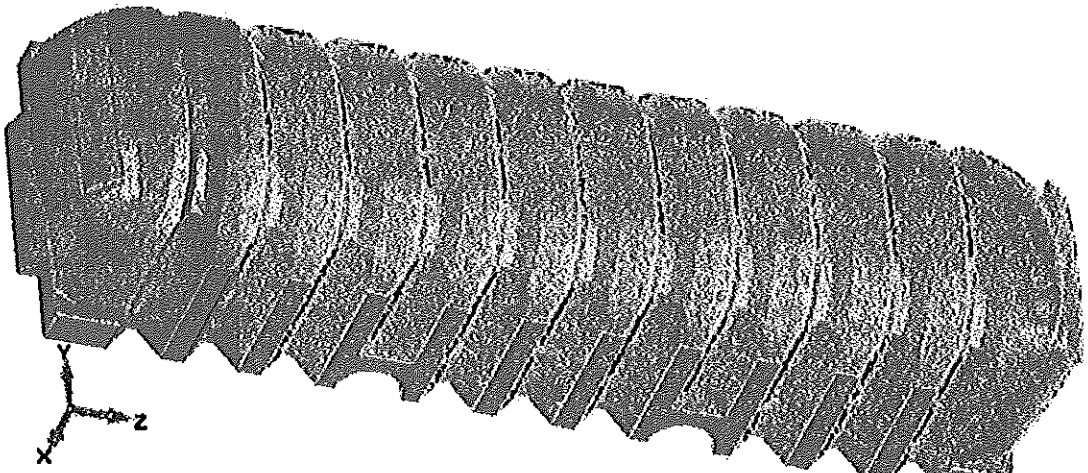
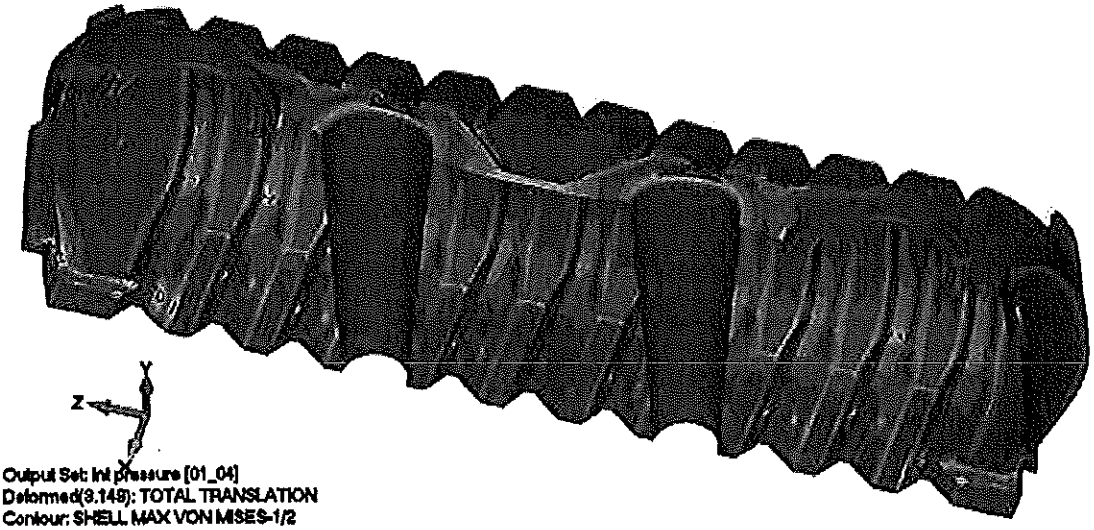
Constraints: Symmetry constraints (XSymm) were applied to the nodes on the cut center plane. Nodes on the longitudinal center line were constrained in the Z direction to prevent rigid body motion. Nodes on the bottom surfaces, shown in orange, were constrained in the vertical (Y) direction.



Results: The linear analysis predicts stresses above the yield strength of the material in a few areas. Some small scale material yield may occur in the tank, but no material failure is expected. Maximum change in overall tank length, width, or height compared to original dimensions is about 2.6% increase in length, which is below the maximum allowable 5%.



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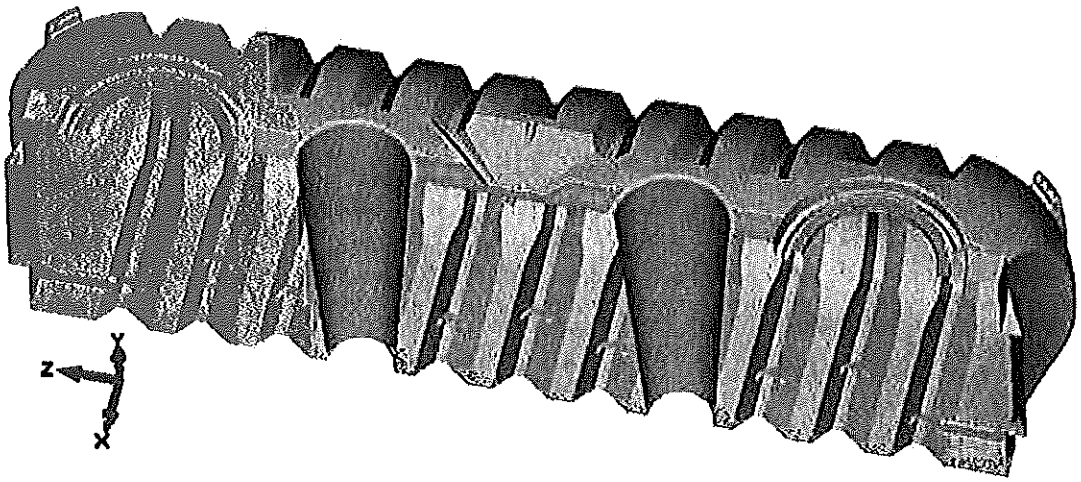
Load case 2: external hydrostatic pressure

From paragraph 3.6, "The external walls shall also be designed to withstand a minimum outside earth pressure equivalent to that exerted by a fluid with a density of 30 lbs/ft^3 (481 kg/m^3)." **COMPLIES**

Applied loads: Pressure loads were applied to all surfaces of the tank. The loads were directed inward perpendicular to each element face. The magnitude of the pressure load increases linearly as a function of fluid density of 30 lbs/ft^3 and depth from the top of the tank.

Constraints: Symmetry constraints (XSymm) were applied to the nodes on the cut center plane. Nodes on the longitudinal center line were constrained in the Z direction to prevent rigid body motion. Nodes on the surfaces around the two top openings, shown in orange, were constrained in the vertical (Y) direction.



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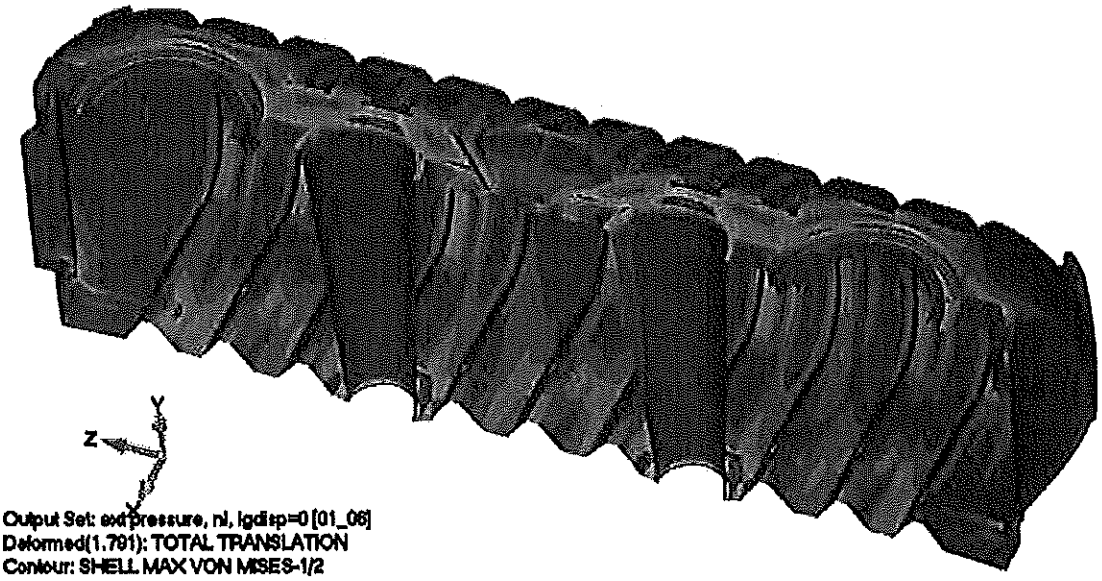
Results: The nonlinear analysis predicts only small areas of stresses above the yield strength of the material. Some small scale material yield may occur in those areas of the tank, but no material failure is expected. Maximum change in overall tank width is about 4.2%.



Load case 3: vertical earth load

From paragraph 3.7, "Septic tanks and covers shall be designed for a vertical earth load of not less than five hundred (500) lbs/ft^2 (24 kPa) when the maximum coverage does not exceed 3 ft. (0.9 m)." **COMPLIES**

Applied loads: Vertical forces (in –Y direction) based on a pressure of 500 lb/ft^2 and the projected elemental horizontal areas were applied to the top surfaces shown in red.

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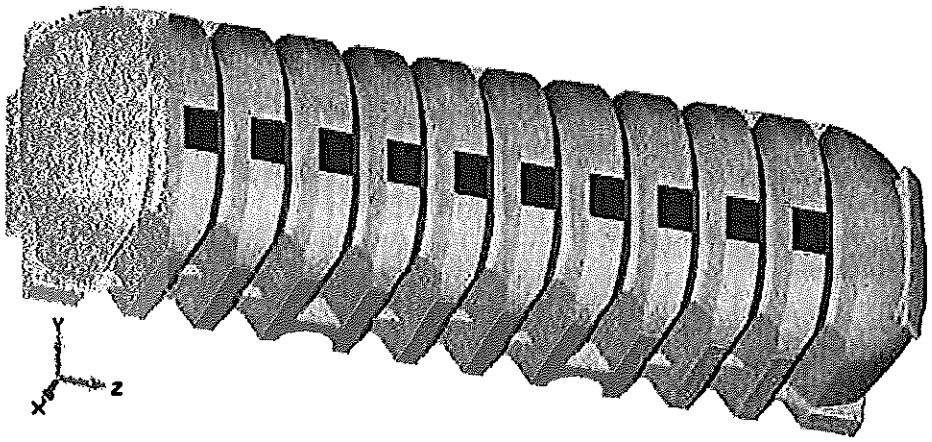
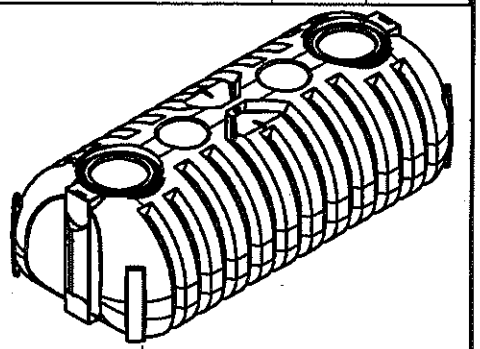
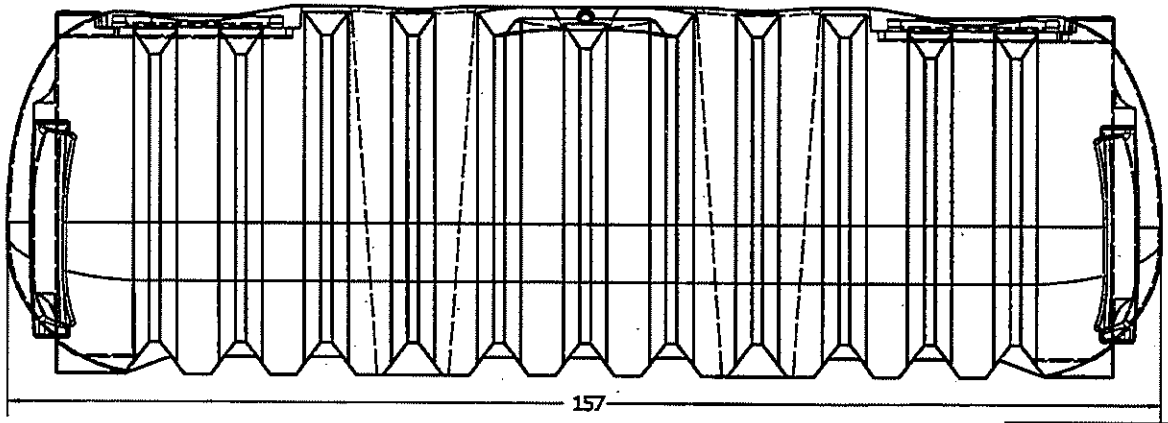
Constraints: Symmetry constraints (XSymm) were applied to the nodes on the cut center plane. Nodes on the longitudinal center line were constrained in the Z direction to prevent rigid body motion. Nodes on the bottom surfaces, shown in orange, were constrained in the vertical (Y) direction. Nodes on the side vertical surfaces, shown in dark blue, were constrained in the lateral (X) direction to account for support from the surrounding soil.

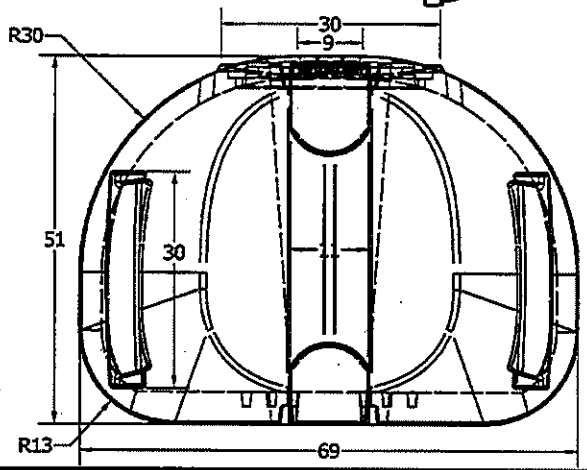


Results: The nonlinear analysis predicts only small areas with stresses above the yield strength of the material. Some small scale material yield may occur in those areas of the tank, but no material failure is expected. Maximum change in overall tank length compared to original dimensions is less than 2%.
Note: Without the lateral supports from the surrounding soil (blue areas on constraint plot), higher stresses and deflections are expected with this loading.

REVISION HISTORY				
ZONE	REV	DESCRIPTION	DATE	APPROVED







DRAWN Todd Bolzer	12/28/2010	NORWESCO, INC., ST. BONIFACIUS, MN
CHECKED		TITLE: 1500 LOW PROFILE SEPTIC
QA		
MFG		
APPROVED		
		SIZE: B; DWG NO: 1500 x 60 x 157; REV:
		SCALE: 1/16; SHEET 1 OF 1